



REPORT OF THE
Hydro-Electric Power
Commission
OF ONTARIO

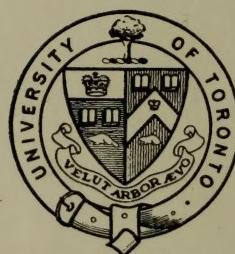
1920

VOL. I.

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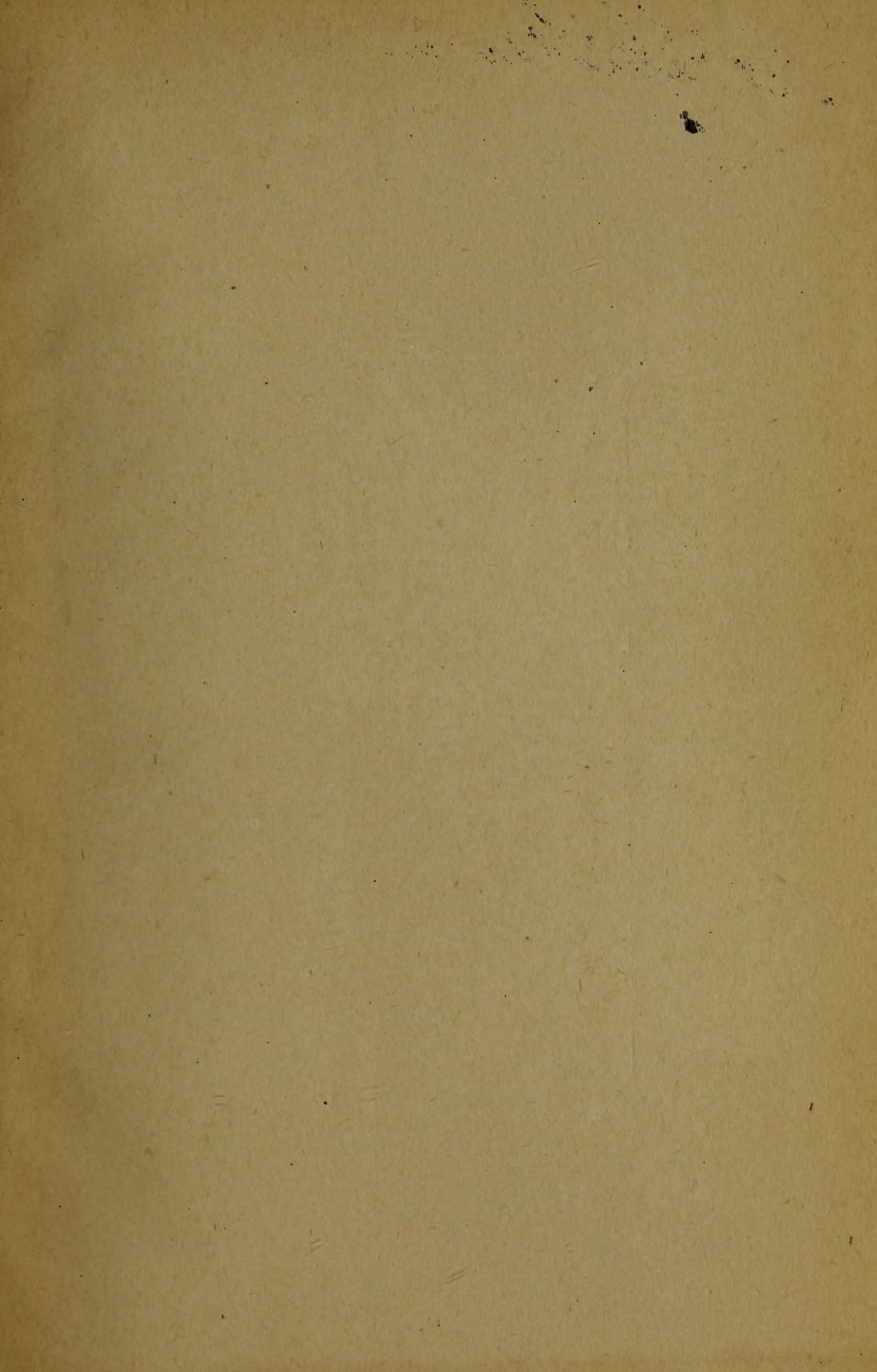
WILLS MACLACHLAN, Esq.

Wills MacLachlan



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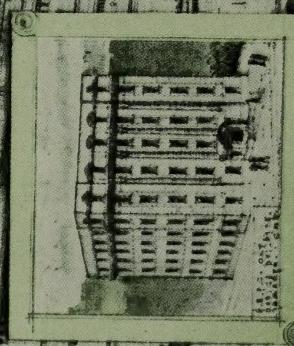


QUEENSTON GENERATING STATION (PROPOSED)

This view shows an inset of the Commission's Administration Building in Toronto drawn to the same scale, thus giving a realistic impression of the vast size of this structure.

PROPOSED
QUEENSTON
GENERATING STATION
K.T.C.
MAY 1891

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Gov. Doc. Ontario Hydro-Electric
Ont. Power Commission
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(Thirteenth) Annual Report

OF THE

HYDRO-ELECTRIC POWER
COMMISSION

OF THE

PROVINCE OF ONTARIO

FOR THE YEAR ENDED OCTOBER 31st

1920

VOLUME I

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

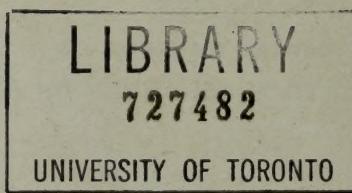


TORONTO:

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1921

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THE RYERSON PRESS.



To His Honour, THE HONOURABLE LIONEL H. CLARKE,

Lieutenant-Governor of Ontario.

MAY IT PLEASE YOUR HONOUR:

The undersigned has the honor to present to your Honour Volume I of the Thirteenth Annual Report of the Hydro-Electric Power Commission of Ontario, for the fiscal year ending October 31st, 1920.

The Annual Report for this year is submitted by the Commission with a feeling of great satisfaction in the knowledge that the results of the year's operations have been the most successful in the history of the Commission.

Throughout the year, the country has been passing through a prolonged period of readjustment, following the great war, and commercial conditions, in many parts of the Province, have, as yet, not become normal. In some of the municipalities, many industries are entirely closed down waiting for a readjustment of the cost of materials and labor before resuming normal production. This business depression mostly affected the Eugenia and Severn Systems, especially the latter, where a number of large industries have not yet commenced operating on normal lines of business, with a consequent reduction in load used by the municipalities on the Severn System, and, a corresponding reduction in load previously purchased from the Eugenia System, thereby reducing the revenue formerly obtained by that system.

The Niagara System is larger than the other systems, and the loss experienced by the dropping off of certain kinds of industries did not as seriously affect the revenue of this system, as was the case with the smaller systems, and the general growth in business in the municipalities on this system more than compensated for the loss of such industries, as were particularly affected during the readjustment period, and the general growth in business on the system was such that toward the end of the year, there was not a sufficient supply of power to meet the demand. This was due, in most part, to the expiration of a contract for a supply of a block of power assumed by the Commission at the time of purchase of the assets of the Ontario Power Company of Niagara Falls. This shortage in power supply greatly handicapped the municipalities on this system, and many of the municipalities were unable to obtain sufficient power to meet the demands of their old customers, and prevented the taking on of much new business, that under normal conditions would have been obtained.

Owing to the abnormal increase in the cost of labor and materials, it was necessary, at the beginning of the year, to increase the rates charged to a number of the smaller municipalities, on this system, but, I am pleased to report that the general increase in business, especially in the smaller municipalities, where it was necessary to make these increases, has resulted in an increase in revenue

sufficient to offset this increased cost of power, so that after meeting all operating costs, the operation of practically every municipality on the system showed a net surplus. The successful operation of the municipalities of the various systems is even more marked when it is borne in mind that the cost of labor and material was maintained at the extremely high level caused by war conditions for practically the entire year. It was only toward the end of the year that the cost of material showed any appreciable tendency to drop; the cost of labor being maintained at an unprecedented high figure throughout the entire year. While the cost of labor throughout the year did not decrease, the efficiency of labor commenced to increase very considerably about the middle of the year, which resulted in a considerable saving to every municipality supplied.

At the beginning of the year, the Commission fixed a schedule of rates to cover the estimated cost of service to all municipalities. The total revenue for the year, under these rates, was \$4,513,404.33, while the cost of service made up of the cost of power, interest, depreciation and maintenance, was \$3,946,132.91, and the necessary fixed charges and renewals, including sinking fund, reserves for renewals and contingencies amounted to \$714,735.61. After meeting all operating expenses, and setting aside the reserves, as above set out (in accordance with Section 23 of the Power Commission Act) the expenditures exceeded the revenue by \$147,464.19; the cost of service to all municipalities exceeding the estimates for the year by only 3.16 per cent., which is a very creditable showing in view of the continued high cost of labor and materials throughout the entire year. Bills and credit memoranda have been forwarded to all municipalities for the difference between the actual cost of service and the power bills, as rendered, which have already been taken up and incorporated in the books of the municipalities, so that the Commission's balance sheet shows neither "Profit" nor "Loss."

NIAGARA SYSTEM

From the beginning of the year, the loads of the various municipalities on the system began to increase considerably, owing to many factories again having resumed operations on commercial lines, after having been previously engaged in the manufacture of war munitions, which loads dropped off early in 1919. The demands of the municipalities on the system for power became so great during the year, that the Commission was unable to obtain sufficient power to meet all of its requirements during peak load hours, and, the municipalities on this account were unable to supply all of the requirements of their customers, with a consequent reduction in revenue to the Commission from the municipalities supplied, and a corresponding loss in revenue to the municipalities from the customers, whose loads it was necessary to restrict.

About the middle of the year, arrangements were made with the Canadian-Niagara Power Company, whereby the Commission obtained an additional supply of 9,000 horsepower. This additional power was of great assistance in meeting the requirements of the municipalities, although, the loads of all of the municipalities had to be restricted, especially towards the end of the year when the power and lighting peaks became coincident.

Throughout the year, the Commission has been endeavoring to arrange for an additional power supply, and, at the time of writing, a second additional block of power has been arranged for with the Canadian-Niagara Power Company, which has helped very materially in meeting the requirements of the municipalities.

Notwithstanding the severe commercial depression that has continued throughout the year, the financial operating statement for the system shows a remarkably successful financial condition in all the municipalities on the system, with regard to the operation of their own distribution systems. Out of the 127 municipalities, as shown in the operating report for this system, all have been able to meet their operating expenses, as well as to set aside a sufficient fund for depreciation, leaving, in each case, a very handsome net surplus, with the exception of seven of the smaller municipalities in which local conditions, due to the financial depression, have affected their industries, which, of course, seriously affected the revenue from their power customers, and four townships, which have been seriously handicapped through shortage of power supply during the year, owing to the fact that they have been unable to take on additional customers on their existing systems, and, in the smaller municipalities on this system, where the cost of power ranges between \$50.00 and \$85.00 per horsepower per year, the operation on their systems show, without an exception, a net surplus for the year's operation.

Queenston-Chippawa Development

During the year, work on the Queenston-Chippawa Development was carried on, as outlined in last year's Report. Considerable trouble was experienced throughout the entire year regarding the supply of common labor, the demand greatly exceeding the supply. For about three months of the year, the construction work was greatly impeded by unsettled labor conditions, and the work was completely shut down for one month on account of a strike. This resulted in a loss of over \$600,000.00 in non-productive overhead, and additional fixed charges due to delay in completion of the work, and, in order to finish the undertaking on schedule time, extra equipment had also to be purchased to compensate, as far as possible, for the time lost in the progress of the work.

During the year, the Commission has contracted for three complete additional generating units, so that the initial installation in the plant will be five units instead of two, as originally intended, which increased capacity will, it is expected, take care of the power requirements of the district for some time to come.

This development is being constructed so as to utilize the total possible head between Lake Erie and Lake Ontario, the total construction head of the plant being 305 feet. The generators are the largest units of their kind in the world, each having a capacity of 55,000 horsepower.

With the added assistance of additional equipment purchased during the year, the construction work is progressing at a very rapid rate. The electrically operated shovels are making a world's record in the removal of earth and rock which is being excavated and disposed of at a rate of one-half million cubic yards per month, and, at the present rate of progress, all the excavation work in the canal proper should be completed by the month of June, 1921.

At the time of writing, the progress on construction work is well in advance of the estimated schedule and with a continuance of this pleasing progress it is expected that the canal will be completed, and the first two generating units in operation, ready to deliver 100,000 horsepower in September, 1921. One turbine has already been erected and is ready for the assembly of the generator, which generators are so large that it is necessary to assemble them at the plant. The second turbine is now being delivered and its installation will commence at once.

The construction work of the power house is well under way, the sub-structure of the building being already completed, and the concrete walls are being poured, and work has already been commenced on the construction of the roof of the building.

EUGENIA SYSTEM

The power demands of the various municipalities supplied on this system remained practically unchanged throughout the year, although, the market for surplus power, which, during the two previous years, was sold to the Severn System, practically ceased entirely. The maintaining of demands equal to those of previous years may be considered a very creditable showing on this system, due to the fact that readjustment of industry from war to normal conditions resulted in the reduction of power loads in nearly all other localities.

During the year, the work of constructing transmission lines and stations to supply a number of additional municipalities in Bruce County has been proceeded with at a rapid pace, and the demands of these municipalities, when connected to the system, will more than compensate for the loss in the power loads supplied to the Severn System to supply industries engaged on war work during the past two years, and, these additional loads will, during the coming year, require the entire output of the Eugenia Development.

The operating report on this system clearly indicates the effect of the loss of the sale of power to the Severn System, previously mentioned, and, for this reason, as well as the loss of a large power load, the total revenue obtained for power supplied on the system was considerably less than it otherwise would have been had this load reduction not taken place.

The financial standing of the system for the year was further affected by the large increase in capital, due to the installation of an additional generating unit in the power plant, and other improvements at the generating station to take care of the prospective loads, already referred to, which additions resulted in a corresponding increase in the interest charges for the year. With the addition of the five municipalities, previously referred to, and a large new industry, which will require a considerable block of power during the coming year, and, also, with the additional loads required by new industries in Hanover, Owen Sound and other municipalities on the system, a demand will be created on the generating plant that will enable this system, in future, to meet all expenses and wipe out the small shortage that has been created during the present year's operation.

WASDELL'S SYSTEM

The results of the year's operation on the Wasdell's System were not affected by the readjustment of industry and manufacturing from war to normal conditions as the district served is essentially an agricultural zone. One large industry was added as a power customer increasing the total amount of power transmitted over the system by approximately 75 per cent. A slight increase in load in the various towns served was also obtained due to the addition of small power customers and additional lighting demand. This system suffered somewhat by a loss of a portion of its ^{the} market in connection with power sold to the Severn System, but the indications of the coming year are favourable for the sale of all surplus power to that district, as well as an increase in demand for power to be supplied to rural districts adjacent to the municipalities of Beaverton, Cannington and Sunderland, and, also, for additional load to be taken by a large customer

at Kirkfield. A special effort was made to give service to the farms located in various townships in Wasdell's District, and considerable detailed work was done for this purpose.

The operating report of this system also shows the effect of the loss of the sale of power to the Severn System. The operating report shows an increase in capital of \$55,899.38, due to the construction of a transmission line from Gamebridge to Kirkfield to serve a large power customer; and, also, due to changing the conductor from the generating station to Beaverton from "steel" to "aluminum." These changes also account for a corresponding increase in interest charges amounting to approximately 34 per cent. over the previous year. As there is every evidence of the load increasing on the Severn System during the coming year, the Wasdell's System will be enabled to market its surplus power in that district, and thereby secure additional revenue. A large new industry is locating on the system, which, together with prospects of sale of power to rural districts, will require the full capacity of the Wasdell's Generating Station, and both increase the revenue on this system and provide for taking care of deficits, which have occurred in the past, and, at the time of writing, the operating conditions on this system show a marked improvement.

SEVERN SYSTEM

The district served by the Severn System was somewhat affected during the year by the general depression of industrial production, due to readjustment from war to normal conditions; consequently, the demand for power was not as great as in previous years. This falling off in load did not, however, affect the system seriously, due to the fact that in previous years the power sold was considerably in excess of the capacity of the Big Chute Generating Plant, and, as this excess was obtained from surplus power available on both the Eugenia and Wasdell's Systems, the Big Chute Plant was kept loaded nearly to capacity throughout the year. Due to the unsettled financial and industrial conditions prevailing during the year, new loads did not come on the system as rapidly as anticipated, the greatest decrease in load being at Collingwood. A large off-peak customer in this municipality discontinued the use of a large block of power entirely, thereby very materially reducing the Collingwood revenue. In addition to the dropping off in load, due to general financial depression, four additional towns on the system commenced to pay sinking fund, which further increased the operating cost of the system for the year, with a result that sufficient charges were not made to this municipality to meet the cost of power supplied. The indications at the close of the year, however, give evidence of a much greater load on the system during the coming year, so much so, in fact, that either a new source of power will have to be provided, or provisions made for obtaining power from either the Niagara, Eugenia or Wasdell's Systems, to take care of the requirements of the system.

THUNDER BAY SYSTEM

This district, at the present time, supplies only one municipality, the City of Port Arthur.

The City of Fort William, however, has signed a contract with the Commission, and will, it is expected, commence taking power from the new Nipigon Plant, in the near future.

The construction of a new generating plant at Cameron's Falls, as well as the connecting transmission line to Port Arthur, proceeded very favourably during the year, and, it is expected that this plant will be completed before the expiration of the Commission's contract for power supply from the Kaministiquia Power Company early during the coming year. The work of constructing this plant was held up considerably on account of adverse conditions of labor and material, with a consequent increase in capital cost, and, as the Commission was advised by the Kaministiquia Power Company that its contract could not be temporarily extend beyond the date of expiration unless the Commission complied with the company's demands, which were considered to be excessive, it was, therefore, necessary to rush the construction work to completion, with a resulting increase in expenditure over the estimated cost of completing this work under normal conditions. The load on the district will be supplied from this new development early during the coming year. In addition to supplying the present requirements of the City of Port Arthur, this plant is being constructed with sufficient capacity to take care of the future requirements of Port Arthur and Fort William, and, also, the requirements of large industries, which are being established in this district, a number of which are now under construction.

MUSKOKA SYSTEM

The year's operation of this system, which comprises the Municipalities of Huntsville and Gravenhurst, indicates a steady demand for power to the full capacity of the generating station, although the industrial conditions, at the close of the year, resulted in a slight falling off of the load in Huntsville. Investigations were made during the year covering an extension to the generating station at South Falls to provide for increased capacity, as the load in both municipalities served was such that the existing equipment was insufficient to supply the complete power requirements. The extension was not proceeded with, however, as later in the year the demand at Huntsville dropped to such an extent as to enable existing equipment to take care of the load. It is expected, however, that as soon as conditions again become normal, arrangements will be made to take care of this extension to the generating plant to provide for increased demands, of which there is every evidence at both Huntsville and Gravenhurst, and quite probably at Bracebridge.

ST. LAWRENCE SYSTEM

Up to the middle of the year 1919, the St. Lawrence System was supplied with power from a small hydraulic plant at Iroquois.

From the 1st of May, 1919, power was supplied through a large sub-station, erected at Cornwall, at which point power was received from the Cedars Rapids Power & Transmission Company. This station was designed to carry a considerably larger load than that required by the municipalities receiving service at that time, and, throughout the year, efforts have been made to extend the system and increase the load. Arrangements have been made to supply power to five new municipalities located north and east of Cornwall, and the lines and stations to serve these municipalities are now being constructed. When these municipalities are connected, the only municipality in the district not being supplied with Hydro-Electric power will be the Town of Cornwall, near which the Commission's High Tension Station is located.

During the year applications for power were received from a number of industries, estimates being requested of the cost of supplying large blocks of power for these industries, at various points on the system.

It is expected that the growth of the load during the coming year will require an extension to be made to the Cornwall Station, to take care of the increased power demands. Already two customers have stated their willingness to sign contracts for large blocks of power, which will place this system on a good financial basis during the coming year.

RIDEAU SYSTEM

During the first half of the year, power was supplied from the Rideau Power Company, at Merrickville, to Smith's Falls and Perth, the Carleton Place Plant being operated to supply the Municipality of Carleton Place.

During part of the year the Municipalities of Smith's Falls and Perth were greatly handicapped on account of shortage of water on the Rideau Canal, due to lack of conservation of the water supply by the canal authorities, and a number of delegations appealed to the Department of Railways and Canals, at Ottawa, to have the water supply properly regulated, in order that the municipalities depending on the power supply obtained from the waters of the Rideau Canal System might not be jeopardized. This lack of sufficient water power necessitated the operation of the Smith's Falls steam plant, with the large consequent increase in operating expenses.

The demands for power on this system have been rapidly increasing since power was first supplied from the plant of the Rideau Power Company, at Merrickville, and, while this plant had sufficient capacity to supply the requirements of the municipalities during the first two years' operation, the growth of the industries in Smith's Falls, Perth and Carleton Place has been so rapid as to require a large additional supply of power, and it was, therefore, necessary, in the face of adverse labour conditions, for the Commission to proceed with the construction of a plant at High Falls, in order to obtain sufficient power to meet the requirements of these municipalities. During the period of the construction of this plant, labour conditions were exceedingly bad, and from the time the work started until its completion, the cost of labour and material had increased by over 100 per cent., with a consequent increase in the capital cost of the plant over the original estimates, which were based on the condition of material and labour existing at the time the construction work was started. On May 1st this plant was put into service, and since that time the power loads of the various municipalities on the system have rapidly increased, and it is expected that during the coming year, with a plentiful supply of power on this system, there will be a marked improvement in the financial condition of the system.

CENTRAL ONTARIO SYSTEM

The financial results of the operation of this system during the fiscal year have been satisfactory. The demand for power increased to such an extent that the Commission decided that additional generating capacity would be required, and authority was therefore obtained for the construction of a new generating station at Ranney's Falls, near Campbellford. The completion of this station will add 10,000 horse power to the capacity of the system. Work on its construction is progressing

favourably, and it is expected that it will be placed in regular service in September, 1921.

Contracts have been entered into between the Commission and a number of municipalities which had not been served previously, and all these new municipalities will receive service early in 1921.

During the month of September and the first half of October the operation of the system was seriously handicapped by low water in the Trent River. The control of the storage reservoirs on the river is not vested in the Commission, and the curtailment of service resulting from the methods employed by those in control was beyond the power of the Commission to prevent. A serious shortage of power for a period of six weeks resulted in great loss to manufacturers in all the municipalities served.

The Campbellford Pulp Mill had a most successful year, owing to the strong demand for groundwood and the high market price.

Respectfully submitted,

ADAM BECK,

Chairman.

TORONTO, ONT., March 30th, 1921.

COLONEL SIR ADAM BECK, Kt., LL.D.,

*Chairman, Hydro-Electric Power Commission of Ontario,
Toronto, Ont.*

SIR.—I have the honour to transmit herewith the Thirteenth Annual Report of the Hydro-Electric Power Commission of Ontario for the fiscal year ending October 31st, 1920.

I have the honour to be,

Sir,

Your obedient servant,

W. W. POPE,

Secretary.

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

COLONEL SIR ADAM BECK, Kt., LL.D., Chairman.

HONOURABLE I. B. LUCAS, K.C.

LT. COL. HON. D. CARMICHAEL, D.S.O., M.C.

W. W. POPE, Secretary.

F. A. GABY, Chief Engineer.

THIRTEENTH ANNUAL REPORT
OF THE
**Hydro-Electric Power Commission
of Ontario**

SECTION I
LEGAL PROCEEDINGS
ACTS

An Act to amend The Water Powers Regulation Act

HIS MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:

1. This Act may be cited as *The Water Powers Regulation Act, 1920.* Short title.
2. *The Water Powers Regulation Act*, as amended by *The Water Powers Regulation Act, 1917*, and section 57 of *The Statute Law Amendment Act, 1918*, is further amended by adding thereto the following section:—
14. Where the owner is developing electrical power or energy by the diversion of the waters of the Niagara River under any contract, agreement, license, lease or other instrument entered into by the owner or his predecessors in title with or granted to the owner or his predecessors in title by the Commissioners of the Queen Victoria Niagara Falls Park, and that he is entitled to divert or use or develops or generates a greater amount of electrical energy than he is entitled to develop or generate under the contract, agreement, license, lease or other instrument, the inspector may with the authority of the Lieutenant-Governor in Council give to the said owner notice in writing to cease diverting or using more water than he is entitled to divert or use or generating or developing a greater amount of electrical power or energy than he is entitled to develop or generate, and if the owner, after the expiration of one month from the giving of said notice, diverts or uses more water than he is entitled to divert or use or develops or generates a greater amount of electrical power or energy than he is entitled to develop or generate, then every franchise or right of occupancy or possession or right to develop or use any of the waters of the Niagara River

or to operate or construct any works which may be enjoyed by the owner therefor, and notwithstanding anything contained in any such contract, agreement, license, lease or other instrument or in any by-law or in any general or special Act of this Legislature shall cease and be at an end.

**Rescission
of order
for delivery
of excess de-
velopment.**

15. The Lieutenant-Governor in Council may, at any time, rescind any order made by him under subsection 2 of section 13 of this Act, and thereupon all right of the owner to develop power or use water or develop or generate power in excess of the owner's rights as found by the said commissioners shall cease, but any such rescission shall not relieve the owner from any penalties incurred by him under subsection 3 of section 13 of this Act prior to the date of such rescission.

『An Act to amend The Hydro-Electric Railway Act

HIS MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:

Short title.

**6 Geo. V.
c. 37, s. 2,
amended.**

**Submission
of by-law.**

**6 Geo. V.
c. 37, s. 3,
amended.**

**Purchasing,
etc., of
railway.**

**4 Geo. V.
c. 31, s. 7,
amended.
Liability
of Province
on bonds.**

1. This Act may be cited as *The Hydro-Electric Railway Act, 1920.*

2. Subsection 5 of section 4 of *The Hydro-Electric Railway Act, 1914*, as enacted by section 2 of *The Hydro-Electric Railway Act, 1916*, is amended by striking out the word "may" in the third line thereof and substituting therefor the word "shall," and by striking out the words "majority of such electors" in the seventh line and substituting therefor the words "majority of the electors voting thereon," and by striking out the words "until at least three months have expired since the date of the sanctioning of the agreement by the Lieutenant-Governor in Council nor" in the clause lettered *a* to the said subsection 5, and the amendments hereby made shall have effect as to any agreement which has heretofore received the sanction of the Lieutenant-Governor in Council, as provided by subsection 4 of the said section.

3. Subsection 6 of section 4 of *The Hydro-Electric Railway Act, 1914*, as amended by section 3 of *The Hydro-Electric Railway Act, 1916*, is repealed and the following substituted therefor:—

(6) The agreement may include in its terms the acquiring by purchase or lease of any steam railway, electric railway or street railway or any part or parts thereof or the obtaining of running rights over the same.

4. Section 7 of *The Hydro-Electric Railway Act, 1914*, is amended by striking out all the words in the first three lines and substituting therefor the following words: "The Province of Ontario shall not be liable in any manner for the payment of any bonds except to the extent

of any guarantee given under the provisions of section 8, nor shall the Commission be liable in any manner for the payment of such bonds except to the extent of."

5. It is declared that all bonds heretofore or hereafter issued by the Hydro-Electric Power Commission of Ontario for the construction and equipment of a railway or any section of a railway under *The Hydro-Electric Railways Act, 1914*, or under this Act shall constitute a first mortgage charge upon the railway or section of a railway and the holder of any such bonds upon default of payment thereof, in addition to any other remedy or recourse shall on behalf of himself and all other bond-holders have the same rights and remedies as a mortgagee of the said railway or section.

6.—(1) Where an agreement has been entered into by the Hydro-Electric Power Commission of Ontario for the construction, equipment, maintenance and operation of a railway under the provisions of *The Hydro-Electric Railway Act, 1914*, and amendments thereto, and notwithstanding that such agreement has not been approved of by the electors of one or more of the municipal corporations named as parties thereto, or has not been executed by any such municipal corporation, the Commission may construct, complete, equip, maintain and operate any section of the railway and may issue the bonds of the Commission for the construction or equipment of such section.

(2) The bonds so issued shall be a charge upon the section of the railway and all the assets, rights, privileges, revenue, works, property and effects belonging thereto or held or used in connection therewith.

(3) *The Hydro-Electric Railway Act, 1914*, and amendments thereto shall apply as if such bonds were issued for the construction of a railway under an agreement entered into in accordance with the provisions of the said Act, and such bonds may be guaranteed in the manner provided by section 8 of the said Act.

(4) The Commission shall not proceed with the construction or equipment of any such section until—

(a) The Lieutenant-Governor in Council has authorized the construction, equipment and operation of such section; and

(b) The council of every municipality in or through which such section or any portion thereof is to be constructed has executed the agreement for the construction of the railway, or if the corporation of any municipality in or through which such section or any portion thereof is to be constructed has not approved and executed such agreement, the councils of the remaining municipalities have by resolution as provided by subsection 1 of section 9 of *The Hydro-Electric Railway Act, 1919*, expressed the desire to proceed with the undertaking and have deposited with the Commission additional

Requisites
to proceed-
ing by Com-
mission.

debentures on the amount required to replace the debentures which would have been deposited by the municipal corporation or municipal corporations failing to execute the agreement.

Deposit of
municipal
debentures.

(5) The corporation of every municipality through or in which any such section, or any portion thereof, is to be constructed shall deposit with the Commission debentures to the amount set out in the schedule to the agreement for the construction of the railway, together with such additional amount as such corporation may undertake to contribute under section 9 of *The Hydro-Electric Railway Act, 1919*, or to such lesser amount as may be necessary to cover the cost of constructing and equipping the section and to provide for the payment of the bonds of the Commission issued therefor.

Debentures
to be dealt
with under
4 Geo. V.
c. 31, s. 11.

(6) The debentures deposited by the municipal corporation for the construction of any such section may be dealt with in all respects in the manner provided by section 11 of *The Hydro-Electric Railway Act, 1914*,

Section to
be deemed
a railway.

(7) Every such section shall be deemed to be a railway constructed and approved under *The Hydro-Electric Railway Act, 1914*, and the amendments thereto.

Rights and
obligations
not affected.

(8) Except so far as otherwise expressly provided by this section, the construction, equipment, and operation of any such section of the railway, shall not affect or increase or diminish any rights or obligations of the Commission or of any municipal corporation under any agreement theretofore or thereafter executed for the construction of a railway which includes such section, or of any other section thereof, and no municipal corporation shall be liable to contribute to the cost of the railway or to any section thereof beyond the amount limited by the agreement executed by it, except for any additional amount which such corporation may have undertaken to contribute under section 9 of *The Hydro-Electric Railway Act, 1919*, upon the failure of any other municipal corporation named as a party to the agreement to approve or execute the same.

Section
retroactive
to 1st July,
1919.

By-laws
confirmed.

(9) This section shall take effect as from the first day of July, 1919.

7.—(1) The by-laws, the forms of which are respectively set out in schedule "A" and schedule "B" to this Act, and which have been heretofore respectively submitted to the vote of the municipal electors of the municipalities named in the schedules to the said by-laws are declared to have been so submitted in due compliance with the provisions of *The Hydro-Electric Railway Act, 1914*, and when finally passed by the council of any of the municipalities named in the contracts appended to each of the said by-laws shall be legal, valid and binding upon the corporation and the ratepayers thereof, anything in any general or special Act of this Legislature to the contrary notwithstanding.

(2) It shall be the duty of the council of every municipality in ^{Council to pass by-laws.} which either of such by-laws have been approved or shall hereafter be approved by the electors, to finally pass the by-law and give effect to the same.

8.—(1) The contracts set out in schedule "A" and schedule "B" to ^{Contracts confirmed.} this Act and purporting to be made respectively between the Hydro-Electric Power Commission of Ontario of the first part, and certain municipal corporations shall be deemed to have been made in pursuance of *The Hydro-Electric Railway Act, 1914*, and to comply with the provisions thereof, and the said contracts shall respectively be legal, valid and binding upon the Commission and upon every municipal corporation a party thereto and executing the same, anything in the said Act or in any other general or special Act of this Legislature to the contrary notwithstanding.

(2) It shall be the duty of the head and the clerk or treasurer of ^{Duty of head and clerk or treasurer as to signing by-law.} each of the said municipal corporations party to either of the said contracts to sign the contracts and affix the seal of the corporation thereto forthwith after the passing of the by-law approving of the same, whether the same shall have been so submitted before or after the passing of this Act.

9. The contract set out in schedule "C" to this Act, and purporting ^{Contract confirmed.} to be made between the Detroit United Railway, the Hydro-Electric Power Commission of Ontario, the Sandwich, Windsor and Amherstburg Railway and the Windsor and Tecumseh Electric Railway Company shall be deemed to have been made in pursuance of *The Hydro-Electric Railway Act, 1914*, and to comply with the provisions thereof, and the said contract shall be legal, valid and binding upon the parties thereto, anything in the said Act or in any other general or special Act of this Legislature to the contrary notwithstanding.

10. This Act shall come into force and take effect on the day ^{on Commencement of Act.} on which it receives the Royal Assent.

AGREEMENTS

SCHEDULE "A."

TORONTO AND EASTERN DIVISION.

By-laws to be Ratified by Legislation.

TOWNSHIPS.	DATE PASSED.	BY-LAW No.
York.....	February 16th, 1920.....	4892
Scarboro.....	December 15th, 1919.....	1000
Pickering.....	November 21st, 1919.....	1123
Whitby.....	December 1st, 1919.....	1026
Whitby East.....	December 15th, 1919.....	857
Darlington.....	December 29th, 1919.....	780
TOWNS.		
Whitby.....	December 1st, 1919.....	1035
Oshawa.....	December 22nd, 1919.....	1452
Bowmanville.....	December 9th, 1919.....	987
CITIES.		
Toronto.....	January 29th, 1920.....	8299

MUNICIPALITY OF THE

of

BY-LAW No. —.

A by-law to authorize a certain agreement made between The Hydro-Electric Power Commission of Ontario and the municipal corporation of the of and other municipal corporations for the construction, equipment and operation of an electric railway under *The Hydro-Electric Railway Act, 1914*, and amendments thereto.

Whereas it is expedient that the corporation of the of and other municipal corporations should enter into an agreement under *The Hydro-Electric Railway Act, 1914*, and amendments thereto, with the Hydro-Electric Power Commission of Ontario, hereinafter called the Commission for the construction, equipment and operation of an electric railway in and through the municipality of the of , and certain other municipalities upon the terms and conditions and subject to the provisions set forth and contained in the agreement set out in this by-law, and according to the routes set forth in schedule "A" to the said agreement;

And whereas the estimated cost of the work under the said agreement is \$8,360,794.00 and whereas the portion of the cost of the construction and equipment of the line to be borne by the corporation of the municipality of the of , is estimated at \$, as set out in schedule "B" to the said agreement, subject to adjustments and apportionment between the corporations by the Commission from time to time, as provided by the said agreement;

And whereas the total amount estimated to be required for the maintenance of the railway, apart from operating expenses, is \$186,588 (the operating revenue being estimated at \$1,118,003, and operation and maintenance at \$658,135);

And whereas the total annual amount estimated to be required for the period of ten years immediately following the date of the issue of the bonds to be issued under the said agreement, for interest on the said bonds is \$418,040 and thereafter, for the next ensuing forty years, the annual amount estimated to be required for sinking fund charges for the retirement of the said bonds is \$83,608 and for interest on the said bonds \$418,040;

And whereas the portion to be borne by the municipality of the of , of the said annual amounts estimated to be required for maintenance, sinking fund charges and interest is estimated at \$ for the first ten years, as aforesaid, and thereafter at \$ on the same basis as the portion of the cost of construction and equipment, as aforesaid, subject to adjustments and apportionment between the corporations by the Commission from time to time as provided by the said agreement;

And whereas the amount of the whole rateable property of the corporation according to the last revised assessment roll is \$, and the amount of the debenture debt of the corporation is \$, of which neither principal nor interest is in arrear;

And whereas only a portion of the municipality of the of as enumerated in schedule "C" to the said agreement, is served by said railway;

Therefore the municipal council of the corporation of the of enacts as follows:—

1. It shall be lawful for the corporation of the of , and the said corporation is hereby authorized to enter into the following agreement with the Hydro-Electric Power Commission of Ontario and other corporations, the said agreement being hereby incorporated into and forming a part of this by-law, and the and clerk of the corporation are hereby authorized and directed to execute the said agreement upon behalf of this corporation and to attach the seal of the corporation thereto.

2. Only those duly qualified property owners in the of , in the district enumerated in schedule "C" of said agreement shall be entitled to vote on the by-law, and any rate required to be levied for payment of debentures or interest thereon shall be raised, levied and collected from the rateable property in such district only.

This indenture made the day of in the year of our Lord, one thousand nine hundred and

Between

The Hydro-Electric Power Commission of Ontario (hereinafter called the "Commission") of the first part,

and

The Municipal Corporations of the Township of York, the Township of Scarborough, the Township of Pickering, the Township of Whitby, the Township of East Whitby, the Township of Darlington, the Town of Whitby, the Town of Oshawa, the Town of Bowmanville and the City of Toronto (hereinafter called the "Corporations") of the second part.

Whereas pursuant to *The Hydro-Electric Railway Act, 1914*, and amendments thereto the Commission was requested to enquire into, examine,

investigate and report upon the cost of construction and operation of an electric railway or railways to be constructed through certain districts in which the corporations are situated, together with the probable revenue that would result from the operation of such railway or railways;

And whereas the Commission has furnished the corporations with such a report showing (1) the total estimated cost, operating revenue and expenses of the railway or railways, and (2) the proportion of the capital cost to be borne by each of the corporations as set forth in schedule "B" attached hereto;

And whereas on receipt of the said report the corporation requested the Commission to construct, equip and operate a system of electric railways (hereafter called the railway) over the routes laid down in schedule "A" attached hereto, upon the terms and conditions and in the manner herein set forth;

And whereas, the Commission has agreed with the corporations on behalf of the corporations to construct, equip and operate the railway upon the terms and conditions, and in the manner herein set forth, but upon the expressed conditions that the Commission shall not in any way be liable by reason of any error or omission in any estimates, plans or specifications for any financial or other obligation or loss whatsoever by virtue of this agreement or arising out of the performance of the terms thereof;

And whereas the electors of each of the corporations have assented to by-laws authorizing the corporations to enter into this agreement with the Commission for the construction, equipment and operation of the railway as laid down in the said schedules, subject to the following terms and conditions;

And whereas the corporations have each issued debentures for the amounts set forth in schedule "B" attached hereto and have deposited the said debentures with the Commission;

Now, therefore, this indenture witnesseth:—

1. In consideration of the premises and of the agreements of the corporations herein contained, and subject to the provisions of the said Act and amendments thereto, the Commission agrees with the corporations respectively:

(a) To construct, equip and operate the railway through the districts in which the corporations are situate on behalf of the corporations;

(b) To construct and operate the railway over the routes laid down in schedule "A";

(c) To issue bonds, as provided in paragraph 3 of this agreement, to cover the cost of constructing and equipping the railway;

(d) To furnish as far as possible first-class modern and standard equipment for use on the railway, to operate this equipment so as to give the best service and accommodation possible, having regard to the district served, the type of construction and equipment adopted and all other equitable conditions, and to express all due skill and diligence so as to secure the most effective operation and service of the railway consistent with good management;

(e) To regulate and fix the fares and rates of toll to be collected by the railway for all classes of service;

(f) To utilize the routes and property of the railway for all purposes from which it is possible to obtain a profit;

(g) To combine the property and works of the railway and the power lines of the Commission where such combination is feasible and may prove economical to both the railway and the users of the power lines;

(h) To permit and obtain interchange of traffic with other railways wherever possible and profitable;

(i) To supply electrical power or energy for operation of the railway at rates consistent with those charged to municipal corporations;

(j) To apportion annually the capital costs and operating expenses of all works, apparatus and plant used by the railway in common with the Commission's transmission lines in a fair manner, having regard to the service furnished by the expenditure under consideration;

(k) To apply the revenue derived from operation of the railway and any other revenue derived from the undertaking to the payment of operating expenses (including electrical power), the cost of administration, and annual charges for interest and sinking fund on the money invested, and such other deductions as are herein provided for;

(l) To set aside from any revenue thereafter remaining an annual sum for the renewal of any works belonging in whole or in part to the undertaking;

(m) To pay over annually to the corporations, if deemed advisable by the Commission in the interests of the undertaking, any surplus that may remain after providing for the items above mentioned. The division of such surplus between the corporations to be fixed by the Commission on an equitable basis, having regard in the case of each corporation to the capital invested, the service rendered, the comparative benefits derived, and all other like conditions;

(n) To take active steps for the purpose of constructing, equipping and operating the railway at the earliest possible date after the execution of this agreement by the corporations and the deposit of the debentures as called for under clause 2b hereof and to commence operation of each section as soon as possible after its completion;

(o) To make such extensions to the railway described in schedule "A" as may appear advantageous and profitable from time to time.

Provided always that as part of any line of railway to be constructed and operated by the Commission, the Commission may purchase, lease or obtain running rights over any steam railway, electrical railway or street railway or any part thereof.

2. In consideration of the premises and of the agreements herein set forth, each of the corporations for itself, and not one for the other, agrees with the Commission:

(a) To bear its share of the cost of constructing, equipping, operating, maintaining, repairing, renewing and insuring the railway and its property and works as established by the Commission, subject to adjustments and apportionment between the corporations by the Commission from time to time;

(b) To issue debentures for the amounts set forth in schedule "B" maturing in fifty years from the date of issue thereof, and bearing interest at a rate of not less than per centum per annum, payable half-yearly at the Bank, at Toronto, Ontario. Such debentures shall be deposited with the Commission previous to the issuing of the bonds mentioned above, and may be held or disposed of from time to time by the Commission, as provided for in clause 4 hereof, in such amounts, at such rates of discount or premium, and on such terms and conditions as the Commission in its sole discretion shall deem to be in the interest of the railway, the proceeds of such debentures being used solely for the purposes herein contained. The amount of debentures of each corporation sold or disposed of from time to time shall be of such proportion as may be fixed by the Commission of the total amount of debentures, due regard being given to the capital invested, the service rendered, the comparative revenue derived, and all other equitable conditions;

(c) To make no agreement or arrangement with, and to grant no bonus, license or other inducement to any other railway or transportation company without the written consent of the Commission;

(d) To keep, observe, and perform the covenants, provisoies and conditions set forth in this agreement intended to be kept and observed and performed by the corporations, and to execute such further or other documents and to pass such by-laws as may be requested by the Commission for the purpose of fully effectuating the objects and intent of this agreement;

(e) To furnish a free right of way for the railway and for the power lines of the Commission over any property of the corporation upon being so requested by the Commission, and to execute such conveyance thereof or agreement with regard thereto as may be desired by the Commission.

3. It shall be lawful, and the Commission is hereby authorized to create or cause to be created, an issue of bonds, and to sell or dispose of the same on behalf of the corporations. Such bonds to be charged upon and secured by the railway, and all the assets, rights, privileges, revenues, works, property and effects belonging thereto or held or used in connection with the railway constructed, acquired, operated and maintained by the Commission under this agreement, and to be for the total amounts mentioned in schedule "B" hereto attached; provided that the Commission may, upon obtaining the consent as herein defined of the majority of the corporations, increase the said bond issue by any amount necessary to cover the capital cost of extending the railway, and may also without such consent increase the said bond issue to cover the cost of additional works or equipment of any kind, for use on the railway, to an extent not exceeding ten per cent. (10%) of the bonds issued from time to time. In order to meet and pay such bonds and interests as the same becomes due and payable, the Commission shall in each year after the expiration of ten years from the date of the issue of the bonds, out of the revenue of the railway, after payments of operating expenses (including electrical power) and the cost of administration set aside a sufficient sum to provide a sinking fund for the purpose of redeeming the same at maturity. Debentures issued by the corporations, in compliance with clause 2b hereof, shall, to the extent of the par value of any bonds outstanding from time to time, be held or disposed of by the Commission in trust for the holders of such bonds as collateral security for payment thereof, it being understood and agreed that, in the event of any increase of the said bond issue, each corporation shall, upon the request of the Commission, deposit with the Commission, additional debentures, as

described in clause 2b hereof; to be held or disposed of by the Commission as collateral security for such increase of the said bond issue, and that any debentures held by the Commission in excess of the par value of the outstanding bonds from time to time may be held or disposed of by the Commission to secure payment of any deficit arising from the operation of the railway.

4. In the event of the revenue derived from the operation of the undertaking being insufficient in any year to meet the operating expenses (including electrical power), the cost of administration and the annual charges for interest and sinking fund on the bonds, and for the renewal of any works belonging in whole or in part to the railway, such deficit shall be paid to the Commission by the corporations upon demand of and in the proportion adjusted by the Commission. In the event of the failure of any corporation to pay its share of such a deficit as adjusted by the Commission, it shall be lawful for the Commission, in the manner provided in clause 2b to dispose of debentures held by the Commission as security for any such deficit. Any arrears by any corporation shall bear interest at the legal rate.

5. Should any corporation fail to perform any of the obligations to the Commission under this agreement, the Commission may, in addition to all other remedies and without notice, discontinue the service of the railway to such corporation in default until the said obligation has been fulfilled, and no such discontinuance of service shall relieve the corporation in default from the performance of the covenants, provisoies and conditions herein contained.

6. In case the Commission shall at any time or times be prevented from operating the railway or any part thereof by strike, lockout, riot, fire, invasion, explosion, act of God, or the King's enemies, or any other cause reasonably beyond its control, then the Commission shall not be bound to operate the railway or such part thereof during such time; but the corporations shall not be relieved from any liability or payment under this agreement, and as soon as the cause of such interruption is removed the Commission shall, without any delay, continue full operation of the railway, and each of the corporations shall be prompt and diligent in doing everything in its power to remove and overcome any such cause or causes of interruption.

7. It shall be lawful for, and the corporations hereby authorize the Commission, to unite the business of the railway with that of any other railway system operated in whole or in part by the Commission, and to exchange equipment and operators from one system to the other, proper provision being made so that each system shall pay its proportionate share of the cost of any equipment used in common.

8. If at any time any other municipal corporation applies to the Commission for an extension of the railway into its municipality, the Commission shall notify the applicant and the corporations, in writing, of a time and place to hear all representations that may be made as to the terms and conditions relating to such proposed extension. If, on the recommendation of the Commission, such extension shall be authorized, without discrimination in favor of the applicant, as to the cost incurred or to be incurred for or by reason of any such extension, the Commission may extend the railway upon such terms and conditions as may appear equitable to the Commission.

No such application for an extension of the railway into any municipality the corporation of which is not a party to this agreement shall be

granted if it is estimated by the Commission that the cost of service of the railways to the corporations parties hereto will be thereby increased or the revenue and accommodation be injuriously affected, without the written consent of the majority of the corporations parties hereto.

9. The consent of any corporation required under this agreement shall mean the consent of the council of such corporations, such consent being in the form of a municipal by-law duly passed by the council of the corporation.

10. The Commission shall, at least annually, adjust and apportion between the corporations the cost of construction, equipment, operation, interest, sinking fund, and also the cost of renewing the property of the railway.

11. Every railway and all the works, property and effects held and used in connection therewith, constructed, acquired, operated and maintained by the Commission under this agreement and the said Act shall be vested in the Commission on behalf of the corporations; but the Commission shall be entitled to a lien upon the same for the money expended by the Commission under this agreement and not repaid.

12. Each of the corporations covenants and agrees with the other:

(a) To carry out the agreements and provisions herein contained;

(b) To co-operate by all means in its power at all times with the Commission to create the most favorable conditions for the carrying out of the objects of the agreement and of the said Act, and to increase the revenue of the railway and ensure its success.

13. In the event of any difference between the corporations the Commission may, upon application, fix a time and place to hear all representations that may be made by the parties, and the Commission shall adjust such differences, and such adjustments shall be final. The Commission shall have all the powers that may be conferred upon a commissioner appointed under *The Act Respecting Enquiries Concerning Public Matters*.

14. This agreement shall continue and extend for a period of fifty years from the date hereof, and at the expiration thereof be subject to renewal, with the consent of the corporations from time to time for like periods of fifty years, subject to adjustment and re-apportionment as herein provided for the purposes of this agreement as though the terms hereof had not expired. At the expiration of this agreement the Commission shall determine and adjust the rights of the corporations, having regard to the amounts paid or assumed by them respectively under the terms of this agreement, and such other considerations as may appear equitable to the Commission and are approved by the Lieutenant-Governor in Council.

15. It is understood and agreed that the rates imposed for the share of the cost to be borne by those municipalities listed in schedule "C" attached hereto, shall be imposed upon the rateable property set forth respectively in the said schedule.

16. This agreement shall not come into effect until it has been sanctioned by the Lieutenant-Governor in Council.

In witness whereof the Commission and the corporations have respectively affixed their corporate seals and the hands of their proper officers.

SCHEDULE "A."

ROUTE.

Toronto-Pickering Section.

Commencing at the proposed terminal in the City of Toronto, the line extends easterly over the property of the Toronto Harbour Commission, thence northerly to the C.N.R., thence easterly to a point near where the C.N.R. crosses St. Clair Avenue, thence extending easterly in a general direction parallel to the G.T.R., crossing Kingston Road at a point near where the latter is intersected by that railway, thence easterly roughly paralleling the Kingston Road, to Pickering.

Pickering-Bowmanville Section.

The line follows the right of way of the present Toronto Eastern Railway through Concession II of the Townships of Pickering, Whitby and Whitby East, passing through the towns of Whitby and Oshawa, thence through Concession II of the Township of Darlington, to Bowmanville.

SCHEDULE "B."

Total amount of debentures to be issued by the respective municipalities and deposited with the Commission under Clause

2b.

Name of Municipal Corporation.	
Township of York	\$381,587
Township of Scarboro	892,686
Township of Pickering	482,050
Township of Whitby	280,304
Township of East Whitby	299,943
Township of Darlington	429,680
Town of Whitby	277,955
Town of Oshawa	771,894
Town of Bowmanville	216,030
City of Toronto	4,328,665
Total amount of bonds to be issued mentioned in Clause 3	\$8,360,794

SCHEDULE "B."

ESSEX COUNTY DIVISION.

By-laws to be Ratified by Legislation.

TOWNSHIPS.	DATE PASSED.	BY-LAW NO.
Sandwich, West.....	December 22nd, 1919.....	561
Sandwich, East.....	December 23rd, 1919.....	823
TOWNS.		
Amherstburg.....	December 23rd, 1919.....	250 B
Ford City	December 23rd, 1919.....	175
Ojibway.....	December 23rd, 1919.....	67
Sandwich.....	December 23rd, 1919.....	831
Walkerville.....	December 23rd, 1919.....	766
CITIES.		
Windsor.....	December 23rd, 1919.....	2467

MUNICIPALITY OF THE

of

BY-LAW No. —.

A by-law to authorize a certain agreement made between The Hydro-Electric Power Commission of Ontario and the municipal corporation of the of and other municipal corporations, for the construction, acquisition, equipment and operation of an electric railway under *The Hydro-Electric Railway Act, 1914, and amendments thereto.*

Whereas it is expedient that the corporation of the of and other municipal corporations should enter into an agreement under the *The Hydro-Electric Railway Act, 1914, and amendments thereto*, with the Hydro-Electric Power Commission of Ontario, hereinafter called the Commission, for the construction, acquisition, equipment and operation of an electric railway in and through the municipality of the of and certain other municipalities, upon the terms and conditions and subject to the provisions set forth and contained in the agreement set out in this by-law, and according to the routes set forth in schedule "A" to the said agreement;

And whereas the estimated cost of the work under the said agreement is \$2,100,000.00, and whereas the portion of the cost of the construction, acquisition and equipment of the line to be borne by the corporation of the municipality of is estimated at as set out in schedule "B" to the said agreement, subject to adjustments and apportionment between the corporations by the Commission from time to time, as provided by the said agreement;

And whereas the total amount estimated to be required for the maintenance of the railway, apart from operating expenses, is \$134,000.00 (the operating revenue being estimated at \$491,000.00) and operation and maintenance at \$339,000.00;

And whereas the total annual amount estimated to be required for the period of ten years immediately following the date of issue of the bonds to be issued under the said agreement for interest on the said bonds is \$95,755.00 and for sinking fund charges is \$18,490.00, and for the period of thirty years following the said ten years period for interest is \$95,755.00 and for sinking fund is \$21,000.00, and for the period of ten years following the said thirty year period for interest is \$12,550.00 and for sinking fund is \$2,510.00;

And whereas the portion to be borne by the municipality of the of the said annual amounts estimated to be required for maintenance, sinking fund, charges and interest is estimated at for the first ten years, as aforesaid, and for the next following thirty years at and thereafter at on the same basis as the portion of the cost of construction and equipment as aforesaid subject to adjustments and apportionment between the corporations by the Commission from time to time as provided by the said agreement;

And whereas the amount of the whole rateable property of the corporation according to the last revised assessment roll is amount of the debenture debt of the corporation is and the of which neither principal nor interest is in arrear;

Therefore, the municipal council of the corporation of the
of enacts as follows:—

1. It shall be lawful for the corporation of the
of and the said corporation is hereby authorized to
enter into the following agreement with the Hydro-Electric Power Commis-
sion of Ontario and other corporations, the said agreement being hereby in-
corporated into and forming a part of this by-law, and the
and clerk of the corporation are hereby authorized and directed to execute
the said agreement upon behalf of this corporation and to attach the seal of
the corporation thereto.

This indenture made the first day of January in the year of our Lord, one
thousand nine hundred and twenty.

Between

The Hydro-Electric Power Commission of Ontario (hereinafter called
the "Commission") of the first part;

and

The Municipal Corporations of the Township of Sandwich East, the
Township of Sandwich West, the Township of Anderdon, the Town of
Ford City, the Town of Walkerville, the Town of Sandwich, the Town
of Ojibway, the Town of Amherstburg, and the City of Windsor (here-
inafter called the "Corporations") of the second part.

Whereas pursuant to *The Hydro-Electric Railway Act, 1914*, and amend-
ments thereto the Commission was requested to enquire into, examine, in-
vestigate and report upon the cost of construction and operation of an
electric railway or railways to be constructed through certain districts in
which the corporations are situated, together with the probable revenue that
would result from the operation of such railway or railways;

And whereas the Commission has furnished the corporations with such
a report showing (1) the total estimated cost, operating revenue and ex-
penses of the railway or railways, and (2) the proportion of the capital cost
to be borne by each of the corporations as set forth in schedule "B" attached
hereto;

And whereas on receipt of the said report the corporations requested the
Commission to construct, equip and operate a system of electric railways
(hereinafter called the railway) over the routes laid down in schedule "A"
attached hereto, upon the terms and conditions and in the manner herein
set forth;

And whereas the Commission has agreed with the corporations on behalf
of the corporations to construct, equip and operate the railway upon the
terms and conditions and in the manner herein set forth; but upon the
express conditions that the Commission shall not in any way be liable by
reason of any error or omission in any estimates, plans or specifications
for any financial or other obligation or loss whatsoever by virtue of this
agreement or arising out of the performance of the terms thereof;

And whereas the electors of each of the corporations have assented to
by-laws authorizing the corporations to enter into this agreement with the

Commission for the construction, equipment and operation of the railway as laid down in the said schedules, subject to the following terms and conditions;

And whereas the corporations have each issued debentures for the amounts set forth in schedule "B" attached hereto, and have deposited the said debentures with the Commission;

Now, therefore, this indenture witnesseth:—

1. In consideration of the premises and of the agreements of the corporations herein contained, and subject to the provisions of the said Act and amendments thereto, the Commission agrees with the corporations respectively;

(a) To construct, equip and operate the railway through the districts in which the corporations are situate on behalf of the corporations;

(b) To construct and operate the railway over the routes laid down in schedule "A";

(c) To issue bonds, as provided in paragraph 3 of this agreement, to cover the cost of constructing and equipping the railway;

(d) To furnish as far as possible first-class modern and standard equipment for use on the railway, to operate this equipment so as to give the best service and accommodation possible, having regard to the district served, the type of construction and equipment adopted and all other equitable conditions, and to exercise all due skill and diligence so as to secure the most effective operation and service of the railway consistent with good management;

(e) To regulate and fix the fares and rates of toll to be collected by the railway for all classes of service;

(f) To utilize the routes and property of the railway for all purposes from which it is possible to obtain a profit;

(g) To combine the property and works of the railway and the power lines of the Commission where such combination is feasible and may prove economical to both the railway and the users of the power lines;

(h) To permit and obtain interchange of traffic with other railways wherever possible and profitable;

(i) To supply electrical power or energy for operation of the railway at rates consistent with those charged to municipal corporations;

(j) To apportion annually the capital costs and operating expenses of all works, apparatus and plant used by the railway in common with the Commission's transmission lines in a fair manner, having regard to the service furnished by the expenditure under consideration;

(k) To apply the revenue derived from operation of the railway and any other revenue derived from the undertaking to the payment of operating expenses (including electrical power), the cost of administration, and annual charges for interest and sinking fund on the money invested, and such other deductions as are herein provided for;

(l) To set aside from any revenue thereafter remaining an annual sum for the renewal of any works belonging in whole or in part to the undertaking;

(m) To pay over annually to the corporations, if deemed advisable by the Commission in the interest of the undertaking, any surplus that may remain after providing for the items above mentioned. The division of such surplus between the corporations to be fixed by the Commission on an equitable basis, having regard in the case of each corporation to the capital invested, the service rendered, the comparative benefits derived, and all other like conditions;

(n) To take active steps for the purpose of constructing, equipping and operating the railway at the earliest possible date after the execution of this agreement by the corporations and the deposit of the debentures as called for under clause 2b hereof and to commence operation of each section as soon as possible after its completion;

(o) To make such extensions to the railway described in schedule "A" as may appear advantageous and profitable from time to time.

Provided always that as part of any line of railway to be constructed and operated by the Commission, the Commission may purchase, lease or obtain running rights over any steam railway, electrical railway or street railway or any part thereof and that wherever the words "construction," "constructed," "construct" or "constructing" occur in this agreement they shall be interpreted as including "acquisition," "acquired," "acquire" or "acquiring."

2. In consideration of the premises and of the agreements herein set forth, each of the corporations for itself, and not one for the other, agrees with the Commission:

(a) To bear its share of the cost of constructing, equipping, operating, maintaining, repairing, renewing and insuring the railway and its property and works as established by the Commission, subject to adjustments and apportionment between the corporations by the Commission from time to time;

(b) To issue debentures for the amounts set forth in schedule "B" maturing in fifty years from the date of issue thereof, and bearing interest at a rate of not less than per centum per annum, payable half-yearly at the Bank, at Toronto, Ontario. Such debentures shall be deposited with the Commission previous to the issuing of the bonds mentioned above, and may be held or disposed of from time to time by the Commission as provided for in clause 4 hereof, in such amounts, at such rates of discount or premium, and on such terms and conditions as the Commission in its sole discretion shall deem to be in the interest of the railway, the proceeds of such debentures being used solely for the purposes herein contained. The amount of debentures of each corporation sold or disposed of from time to time shall be such proportion as may be fixed by the Commission of the total amount of debentures, due regard being given to the capital invested, the service rendered, the comparative revenue derived and all other equitable conditions;

(c) To make no agreement or arrangement with, and to grant no bonus, license or other inducement to any other railway or transportation company without the written consent of the Commission;

(d) To keep, observe and perform the covenants, provisoies and conditions set forth in this agreement intended to be kept and observed and performed by the corporations, and to execute such further or other documents and to pass such by-laws as may be requested by the Commission for the purpose of fully effectuating the objects and intent of this agreement;

(e) To furnish a free right of way for the railway and for the power lines of the Commission over any property of the corporations upon being so requested by the Commission, and to execute such conveyance thereof or agreement with regard thereto as may be desired by the Commission.

3. It shall be lawful and the Commission is hereby authorized to create or cause to be created an issue of bonds, and to sell or dispose of the same on behalf of the corporations. Such bonds to be charged upon and secured by the railway, and all the assets, rights, privileges, revenues, works, property and effects belonging thereto or held or used in connection with the railway constructed, acquired, operated and maintained by the Commission under this agreement, and to be for the total amounts mentioned in schedule "B" hereto attached; provided that the Commission may, upon obtaining the consent as herein defined of the majority of the corporations, increase the said bond issue by any amount necessary to cover the capital cost of extending the railway, and may also without such consent increase the said bond issue to cover the cost of additional works or equipment of any kind for use on the railway to an extent not exceeding ten per cent. (10%) of the bonds issued from time to time. In order to meet and pay such bonds and interest as the same becomes due and payable the Commission shall in each year after the expiration of ten years from the date of the issue of the bonds out of the revenue of the railway after payments of operating expenses (including electrical power) and the cost of administration set aside a sufficient sum to provide a sinking fund for the purpose of redeeming the same at maturity. Debentures issued by the corporations in compliance with clause 2b hereof, shall, to the extent of the par value of any bonds outstanding from time to time, be held or disposed of by the Commission in trust for the holders of such bonds as collateral security for payment thereof, it being understood and agreed that in the event of any increase of the said bond issue each corporation shall, upon the request of the Commission, deposit with the Commission additional debentures as described in clause 2b hereof, to be held or disposed of by the Commission as collateral security for such increase of the said bond issue, and that any debenture held by the Commission in excess of the par value of the outstanding bonds from time to time may be held or disposed of by the Commission to secure payment of any deficit arising from the operation of the railway.

4. In the event of the revenue derived from the operation of the undertaking being insufficient in any year to meet the operating expenses (including electrical power), the cost of administration and the annual charges for interest and sinking fund on the bonds, and for the renewal of any works belonging in whole or in part to the railway, such deficit shall be paid to the Commission by the corporations upon demand of and in the proportion adjusted by the Commission. In the event of the failure of any corporation to pay its share of such a deficit as adjusted by the Commission, it shall be lawful for the Commission in the manner provided in clause 2b to dispose of debentures held by the Commission as security for any such deficit. Any arrears by any corporation shall bear interest at the legal rate.

5. Should any corporation fail to perform any of the obligations to the Commission under this agreement, the Commission may, in addition to all other remedies and without notice, discontinue the service of the railway to such corporation in default until the said obligation has been fulfilled, and no such discontinuance of service shall relieve the corporation in default from the performance of the covenants, provisoies and conditions herein contained.

6. In case the Commission shall at any time or times be prevented from operating the railway or any part thereof by strike, lockout, riot, fire, invasion, explosion, act of God, or the King's enemies, or any other cause reasonably beyond its control, then the Commission shall not be bound to operate the railway or such part thereof during such time; but the corporations shall not be relieved from any liability or payment under this agreement, and as soon as the cause of such interruption is removed the Commission shall, without any delay, continue full operation of the railway, and each of the corporations shall be prompt and diligent in doing everything in its power to remove and overcome any such cause or causes of interruption.

7. It shall be lawful for, and the corporations hereby authorize the Commission to unite the business of the railway with that of any other railway system operated in whole or in part by the Commission, and to exchange equipment and operators from one system to the other, proper provision being made so that each system shall pay its proportionate share of the cost of any equipment used in common.

8. If at any time any other municipal corporation applies to the Commission for an extension of the railway into its municipality the Commission shall notify the applicant and the corporations, in writing, of a time and place to hear all representations that may be made as to the terms and conditions relating to such proposed extension. If, on the recommendation of the Commission, such extension shall be authorized, without discrimination in favor of the applicant, as to the cost incurred or to be incurred for or by reason of any such extension, the Commission may extend the railway upon such terms and conditions as may appear equitable to the Commission.

No such application for an extension of the railway into any municipality the corporation of which is not a party to this agreement shall be granted if it is estimated by the Commission that the cost of service of the railway to the corporations parties hereto will be thereby increased or the revenue and accommodation be injuriously affected without the written consent of the majority of the corporations parties hereto.

9. The consent of any corporation required under this agreement shall mean the consent of the council of such corporations, such consent being in the form of a municipal by-law duly passed by the council of the corporation.

10. The Commission shall, at least annually, adjust and apportion between the corporations the cost of construction, equipment, operation, interest, sinking fund, and also the cost of renewing the property of the railway.

11. Every railway and all the works, property and effects held and used in connection therewith, constructed, acquired, operated and maintained by the Commission under this agreement and the said Act shall be vested in

the Commission on behalf of the corporations; but the Commission shall be entitled to a lien upon the same for all money expended by the Commission under this agreement and not repaid.

12. Each of the corporations covenants and agrees with the other:

(a) To carry out the agreements and provisions herein contained;

(b) To co-operate by all means in its power at all times with the Commission to create the most favourable conditions for the carrying out of the objects of the agreement and of the said Act, and to increase the revenue of the railway and ensure its success.

13. In the event of any difference between the corporations the Commission may, upon application, fix a time and place to hear all representations that may be made by the parties, and the Commission shall adjust such differences and such adjustments shall be final. The Commission shall have all the powers that may be conferred upon a commissioner appointed under *The Act Respecting Enquiries Concerning Public Matters*.

14. This agreement shall continue and extend for a period of fifty years from the date hereof, and at the expiration thereof be subject to renewal, with the consent of the corporations from time to time for like periods of fifty years, subject to adjustment and reapportionment as herein provided for the purposes of this agreement as though the terms hereof had not expired. At the expiration of this agreement the Commission shall determine and adjust the rights of the corporations, having regard to the amounts paid or assumed by them respectively under the terms of this agreement, and such other considerations as may appear equitable to the Commission and are approved by the Lieutenant-Governor in Council.

15. It is understood and agreed that the rates imposed for the share of the cost to be borne by those municipalities listed in schedule "C" attached hereto, shall be imposed upon the rateable property set forth respectively in the said schedule.

16. This agreement shall not come into effect until it has been sanctioned by the Lieutenant-Governor in Council.

In witness whereof the Commission and the corporations have respectively affixed their corporate seals and the hands of their proper officers.

SCHEDULE "A."

ROUTES.

Tecumseh-Ford Section.

Leaving Tecumseh the line runs northerly alongside of the Highway to Askin's Point on Lake St. Clair, where it turns due west along Lesperance Road to Wolfs; private right-of-way is then used to the end of Ottawa Avenue and then along the said avenue to the easterly limits of the Town of Ford City.

Ford City Section.

From the easterly limits of Ford City the line extends along Ottawa Avenue, Strabane and Sandwich Streets to the westerly limit of the municipality.

Walkerville Section.

One line extends along Sandwich Street from the easterly to the westerly limits of the municipality. A second line extends along Ottawa Street between Lincoln and Walker Roads. A third line extends from the Essex Terminal railway tracks at Walker Road, northerly to Wyandotte Street and west on Wyandotte to the municipal boundary between Walkerville and Windsor. A fourth line extends northerly from Wyandotte along Devonshire Road, Assumption and Victoria Roads to intersect the first line, above-mentioned, on Sandwich Street.

Windsor City Section.

One line extends westerly along Sandwich Street from the municipal boundary of the Town of Walkerville to Elm Avenue and then southerly on the said Avenue to London Street. A second line extends westerly from the Walkerville boundary on Wyandotte Street to Ouellette Avenue. A third line extends southerly on Ouellette Avenue from Sandwich to the Race Track that is located on Tecumseh Road. A fourth line extends westerly on London Street from Ouellette to the westerly boundary of the City. A fifth line extends southerly on Wellington Avenue from London Street to Tecumseh Road.

Sandwich Town Section.

From the easterly boundary of the municipality the line extends westerly to the Springs Loop near the Salt Company's plant at the west end of the municipality.

Sandwich-Amherstburg Section.

From the Springs Loop in Sandwich the line extends along Redford Street and Main Street, Ojibway, to the River Road at Turkey Creek, and then due south along the said River Road to the Town of Amherstburg, entering the said town along Apsley and Richmond Streets.

SCHEDULE "B."

Total amount of debentures to be issued by respective municipalities for deposit with the Commission under clause 2b.

Name of Municipal Corporation.	
Township of Sandwich East	\$260,685
Township of Sandwich West	251,570
Township of Anderdon	143,536
Town of Ford City	64,582
Town of Walkerville	200,940
Town of Sandwich	262,173
Town of Ojibway	44,515
Town of Amherstburg	126,867
City of Windsor	745,132

Total amount of bonds to be issued mentioned in clause 3 \$2,100,000

SCHEDULE "C."

This agreement, made the 14th day of January, one thousand nine hundred and twenty,

Between

Detroit United Railway, a corporation organized and existing under the laws of the State of Michigan, hereinafter called the "Vendor," of the first part;

and

The Hydro-Electric Power Commission of Ontario, hereinafter called the "Purchaser," of the second part;

and

Sandwich, Windsor & Amherstburg Railway, hereinafter called the "Sandwich Company," of the third part;

and

The Windsor & Tecumseh Electric Railway Company, hereinafter called the "Windsor Company," of the fourth part.

Whereas the Vendor owns and controls all the outstanding shares of the capital stock of the Sandwich Company, and all the outstanding shares of the capital stock of the Windsor Company, all of the said shares being fully paid up;

And whereas the Vendor has agreed to sell and the Purchaser has agreed to purchase all the assets and undertakings and property of the said companies for the consideration hereinafter mentioned;

Now this agreement witnesseth:—

1. The Vendor agrees to sell and the Purchaser agrees to purchase, as of July 1st, 1919, all the assets, undertakings and property of every kind and nature belonging to the said companies, or to which the said companies, or either of them, are or is entitled in connection with their or its business, viz.:

(a) All freehold and leasehold lands, easements and interests in lands;

(b) All plant, machinery, rolling stock, works, buildings, fixtures, equipment, apparatus, furniture, stock in trade, stores, goods, chattels and effects, other than supplies as hereinafter defined;

(c) All franchises, patents, licenses, agreements and rights, and all documents, including title deeds, contracts, books of account, plans, records and specifications;

(d) All the outstanding shares of the capital stock of each of the said companies fully paid up, and all shares or other securities in any subsidiary company belonging to the companies or either of them;

(e) All other property to which the said companies or either of them are or is entitled in connection with their or its business, except cash, promissory notes, book accounts, and other bills and accounts receivable, as of the date of completion hereinafter mentioned.

It is understood and agreed that the Vendor shall be entitled to retain, and shall not be obligated to give to the Purchaser, any profits made in carrying on the business of the companies between the said July first, 1919, and the date of completion of this agreement, as hereinafter defined.

For greater certainty, but without restricting the generality of the foregoing, an inventory of assets and undertakings and property of the said companies, as of the said date, is attached to this agreement as schedule "A."

2. The consideration for the sale shall be:

(a) The sum of two million and thirty-nine thousand dollars (\$2,039,000.00), which shall be paid and satisfied by the issue and delivery, in the manner hereinafter described, of bonds of the Hydro-Electric Power Commission of Ontario, of one thousand dollars (\$1,000) each, bearing the date of completion, hereinafter defined, and payable forty years from said date in gold coin of, or equivalent to, the present Canadian standard of weight and fineness, with interest thereon at the rate of four and one-half per cent. per annum, payable half-yearly in like money at the main branch of the Bank of Montreal in the City of Toronto; and guaranteed as to principal and interest by the Province of Ontario;

(b) Payment in cash at the market price for the material and supplies which may be on hand on the date of completion of this agreement, belonging to either of the said companies, on said date, in accordance with an inventory thereof to be prepared by the Vendor, and verified and agreed to by the Purchaser; such inventory to include material of the classes and character shown in inventory dated October, 1919, and submitted to the Commission with letter of November third, 1919, and to be identified at the time of the execution of this agreement;

(c) The cost of any extensions and improvements, which are properly chargeable to capital account, and which are made after the signing of this agreement, shall be added to the consideration, but such extensions and improvements shall not be made without notice to and the consent of the Purchaser.

3. The Vendor covenants with the Purchaser that the assets, undertakings and property of the said companies are free from all encumbrances, except the following:—

(a) Trust mortgage by the Sandwich Company, dated December first, 1902, to National Trust Company, Limited, to secure the payment of bonds to the amount of six hundred thousand dollars (\$600,000.00), all of which have been issued and are outstanding and become due as to principal on December first, 1922, and have attached thereto interest coupons at the rate of four and one-half per cent. per annum, payable on the first days of June and December in each year during the currency of said bonds;

(b) Trust mortgage by the Windsor Company, dated September second, 1907, to National Trust Company, Limited, to secure bonds to the amount of

three hundred thousand dollars (\$300,000.00), of which have been issued and are outstanding bonds to the amount of one hundred and eighty-nine thousand dollars (\$189,000.00), which become due as to principal on September second, 1927, and have attached thereto interest coupons at the rate of five per cent. per annum, payable on the second days of March and September in each year during the currency of the said bonds.

4. The Purchaser will, on the date for the completion of this agreement, deliver to the Vendor one million two hundred and fifty thousand dollars (\$1,250,000.00) par value of the said Hydro-Electric bonds, and will deliver to said National Trust Company, Limited, of Toronto, seven hundred and eighty-nine thousand dollars (\$789,000.00) of the said bonds in escrow, to be delivered in whole or in part to the Vendor, upon the payment and retirement, either at maturity or prior thereto, from time to time, of the whole or any part of the said outstanding bond issues of the said companies, aggregating seven hundred and eighty-nine thousand dollars (\$789,000.00), on the basis of the same amount in par value of the bonds so delivered in escrow against the same amount of bonds so paid off and retired. The Purchaser will cause the interest coupons on the bonds so held in escrow to be delivered to the Vendor or its nominees as such coupons fall due, provided that the Vendor will mutually cause to be delivered to the Purchaser the interest coupons on the bonds of the said companies, duly paid and cancelled from time to time, as they fall due.

5. The Vendor covenants with the Purchaser that the Vendor will pay and discharge the said mortgages mentioned in paragraph three hereof, and will pay and retire the principal of the said bonds of the companies, aggregating seven hundred and eighty-nine thousand dollars (\$789,000.00), and all interest coupons thereon, and that the other liabilities of the companies or either of them, whether direct, indirect, contingent, accruing, or accrued, at the time of completion, shall be only those described in schedule "B" hereof, which are to be adjusted to date of completion, and the Vendor covenants with the Purchaser that it will pay and settle all other liabilities not therein mentioned and indemnify the Purchaser from any claim in connection therewith.

6. All current contracts, taxes, local improvement rates, assessments, rents, insurance and interest (other than the interest on the said bonds, to be paid by the Vendor), shall be adjusted as of the date of completion, and the balance paid in cash by the Vendor or Purchaser, as the case may be. If any estimate shall, after completion, prove inaccurate, the excess or deficiency, when determined, shall be paid by the party liable.

7. The Vendor agrees to assume all liabilities for injuries and damages of the said companies, or either of them, which may arise prior to the said date of completion, and covenants to protect and save harmless the Purchaser from all claims in connection therewith, and to defend at its own expense any legal proceedings which may be brought in respect thereof;

8. The Vendor agrees to pay to the Purchaser the value of all revenue tickets sold by either of the companies prior to the said date of completion that are taken up for fare, or presented for redemption, for a period of sixty days after the said date of completion forthwith upon the delivery of such tickets by the Purchaser to the Vendor;

9. The Vendor agrees that the companies will, until the date for completion, repair and keep in repair and good working order and condition, reasonable wear and tear only excepted, all assets, undertakings and property of the said companies, and will, pending said date for completion, carry on the respective businesses of the companies in the usual and ordinary manner; and that the assets and property of the companies as of the date of completion will be of not less value than those described in paragraph one and schedule "A" hereof;

10. The Vendor agrees that neither of the said companies will, before the said date of completion, create or issue any further shares of their capital stock respectively, or any bonds, debentures or like securities; and that neither of the said companies will surrender any of their franchise rights or privileges, or do, permit, or permit to be done, or do any act or thing whereby any such rights or privileges may become forfeited or terminated, or liable to forfeiture or termination; and that after completion of this agreement the Vendor will, upon the request and at the expense of the Purchaser, furnish to the Purchaser any and all information in connection with the affairs of the said companies or either of them;

11. Upon the completion of the sale under this agreement the Vendor will cause to be tendered the resignation of all directors of each of the said companies, and undertakes that the boards of directors of the said companies will assist the Purchaser in the acceptance of such resignations and in the election of new directors nominated by the Purchaser and will cause to be tendered the resignation of all officers of the said companies respectively, or cause their employment to be terminated as of the date of completion.

12. This agreement is subject to the following conditions:—

(a) The approval thereof by the Lieutenant-Governor of the Province of Ontario in Council;

(b) The passing by the municipalities in the Province of Ontario affected thereby of the necessary by-laws;

(c) The passing by the Ontario Government of an Order-in-Council authorizing the guarantee by the Province of Ontario of the Hydro-Electric bonds referred to in paragraph three hereof;

13. The date for completion of this agreement shall be sixty days after the fulfilment of the conditions stated in the next preceding clause. The Purchaser shall notify the Vendor as soon as the said conditions have been fulfilled, and not later than January 31st, 1920, that it is prepared to carry out its part of this agreement within sixty days after the fulfilment of the said conditions, whereupon the Vendor shall be prepared within such time to carry out and complete its part of this agreement. Failure on the part of the Purchaser to notify the Vendor, as above provided, shall entitle the Vendor to declare this agreement null and void.

14. The Purchaser shall have thirty days after the giving of the said notice in which to examine the titles and franchises of the companies. The Vendor shall not be obliged to deliver any abstract of title or incur any expense in connection with such examination, but will cause the Purchaser to be permitted to inspect all documents relating to such titles and franchises. If any objection or requisition in respect thereto be made by the

Purchaser which the Vendor may be unwilling to comply with, the Vendor shall have the right to rescind this agreement by written notice, provided that the Purchaser may waive such objection or requisition by giving notice in writing to that effect within fifteen days after the receipt of such notice of rescission, and thereupon this agreement shall remain in full force and effect as though such objection or requisition had never been made. If the Purchaser shall not have made any requisition or objection to the said titles and franchises within the said period of thirty days, or if all requisitions or objections so made have been removed or complied with or waived, the Purchaser shall be deemed to have accepted the said titles and franchises.

15. The Sandwich Company and the Windsor Company and each of them assents to this agreement, and agree and each of them agrees with the Purchaser that they and each of them will, at the expense of the Vendor, facilitate in all reasonable ways the due carrying out of all the terms of this agreement to be carried out by the Vendor, and that they and each of them will act in such manner as the Vendor has herein covenanted that they and each of them will act.

16. This agreement shall be construed according to the law of the Province of Ontario, and the completion thereof shall take place at the office of the Purchaser at Toronto, Ontario.

17. The obligations, rights and benefits of the Vendor and Purchaser shall be binding upon and extend and enure to their successors and assigns respectively.

In witness whereof these presents have been duly executed by the parties hereto the date and year first above written.

Signed, Sealed and Delivered in the presence of

Attest.

(Seal.)

A. E. PETERS, *Secretary.*

Attest.

A. E. PETERS, *Secretary.*

Attest.

A. E. PETERS, *Secretary.*

DETROIT UNITED RAILWAY.

By A. F. EDWARDS,

Vice-President.

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.

By I. B. LUCAS,

Vice-Chairman.

By W. W. POPE, *Secretary.*

SANDWICH, WINDSOR AND AMHERSTBURG RAILWAY.

By JAMES ANDERSON,

Vice-President.

THE WINDSOR & TECUMSEH ELECTRIC RAILWAY COMPANY.

By JAMES ANDERSON,

Vice-President.

(Seal.)

An Act to amend The Power Commission Act

HIS MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

1. This Act may be cited as *The Power Commission Act, 1920.* Short title.
2. Section 8 of *The Power Commission Act* is amended by adding thereto the following clause: Rev. Stat. c. 39, s. 8, amended.
 - (aa) Acquire by purchase, lease or otherwise or construct, erect, works for maintain and operate works for the production of electrical power or energy by the use of coal, oil or any other means whatsoever.
3. *The Power Commission Act* is amended by adding thereto the following sections: Rev. Stat. c. 39, amended.
 - 21a. Notwithstanding anything contained in section 21 it shall not be necessary to obtain the approval of the Lieutenant-Governor in Council to any contract for a supply of electrical power or energy by the Commission to any person from time to certain contracts. Approval of Lieutenant-Governor in Council not required to certain contracts.
 - 21b. Where the Commission has heretofore entered or shall hereafter enter into an agreement for the supplying of electrical power or energy or for any other work or service to be done or supplied by or to the Commission, and such agreement has been or shall hereafter be submitted to and approved by the Lieutenant-Governor in Council such agreement shall thereupon be confirmed and be legal, valid and binding upon the parties thereto and shall not be open to question upon any grounds whatsoever, anything in this Act or in any other Act to the contrary notwithstanding. Effect of approval of agreements by Commission.
4. *The Power Commission Act* is amended by adding thereto the following section: Rev. Stat. c. 39, amended.
 - 24b. Where the appropriation made by the Legislature for any work of the Commission shall become exhausted in any fiscal year and the chairman reports to the Lieutenant-Governor in Council that it is necessary and expedient that such work shall be proceeded with and that an additional sum is required for that purpose, the Lieutenant-Governor in Council may order a special warrant to be prepared to be signed by the Lieutenant-Governor for the issue of the amount estimated to be required in such fiscal year, and when issued such amount shall be placed by the Treasurer of Ontario to the credit of a special account against which cheques may be issued in favour of the Commission for such amounts as shall be required. Where appropriation is exhausted special warrant may issue.

Rev. Stat.
c. 39,
amended.

5. *The Power Commission Act* is amended by adding thereto the following sections:

Contracts
for con-
struction
and opera-
tion of dis-
tribution
works in
townships.

PART IIB.

Construction and Operation of Distribution Works in Rural Power Districts.

30e. Subject to the approval of the Lieutenant-Governor in Council, the Commission may enter into a contract with the municipal corporation of a township or with the municipal corporations of two or more townships for the supply and distribution of electrical power or energy in a defined area (hereinafter called a rural power district), including a part of such township or parts of each of such townships, and the Commission may, in pursuance of such contract, construct and operate all works necessary for the transmission of electrical power or energy to the rural power district and for the transforming and distributing of such electrical power or energy to the premises of the persons within the rural power district as so defined or as enlarged or altered from time to time by the Commission with the approval of the Lieutenant-Governor in Council and the municipal council or councils.

By-law.

30f. The council of the township or the council of each of such townships party to such contract, may pass a by-law for entering into such contract and may execute the same, and it shall not be necessary to submit any such by-law to the vote of the electors or to comply with any of the other forms required in the case of a by-law passed under Part I of this Act.

Apportion-
ment of cost
on annual
adjustment.

30g.—(1) The Commission shall annually fix, adjust and apportion the cost of all the works mentioned in section 30e to be borne by each of the municipal corporations entering into such contract.

Amount of
contribu-
tions by
townships.

(2) The total amount for which each of the corporations shall be liable shall include a sum sufficient to provide annually the corporation's proportionate cost of the capital cost of the work so as to form in thirty years a sinking fund for the payment of the amount expended by the Commission on capital account for the acquisition or construction of the works necessary for transmitting, transforming, distributing and delivering electrical power or energy in a rural power district and a further sum sufficient to pay the Commission interest upon the proportionate part of such expenditure to be borne by the corporation, and a further sum to pay the corporation's proportionate part of the line loss and the costs of operating, maintaining, renewing and insuring of such works and of the other charges set out in section 23.

- 30h. The rates to be charged to customers receiving electrical Rates.
power or energy from the Commission in a rural power dis-
trict shall be fixed by the Commission from time to time and
shall be sufficient to provide the sum necessary to pay all the
charges to be borne by the corporation under section 30g.
- 30i. All the provisions of Part I as to the annual payments to be Application
made by the corporations which have entered into contracts of Part I.
with the Commission shall apply to a contract entered into
under this Part.
- 30j. Where any person receiving a supply of electrical power or Collection
energy in a rural power district is in default of payment of rates
in arrear, any account due in respect of such supply, the Commission
may notify the corporation of the municipality in which
the premises of the person so in default are situate stating
the amount due and such amount shall thereupon be entered
upon the collector's roll of the municipality and collected in
the same manner as other taxes.

6. By-law No. 38 of the Corporation of the Town of Port Colborne; By-laws confirmed.
By-law No. 780 of the Corporation of the Town of Niagara; By-laws Nos. 796, 808 and 809 of the Corporation of the Town of Carleton Place; By-laws Nos. 320 and 323 of the Corporation of the Town of Alexandria; By-laws 257 and 258 of the Corporation of the Village of Glencoe; By-law No. 461 of the Corporation of the Village of Markham; By-laws Nos. 413 and 414 of the Corporation of the Village of Maxville; By-law No. 634 of the Corporation of the Township of Ancaster; By-laws Nos. 720 and 732 of the Corporation of the Township of London; By-law No. 495 of the Corporation of the Township of Eldon; By-law No. 55 of the Corporation of the Township of Scott; By-laws Nos. 2480 and 2523 of the Corporation of the City of Windsor; By-law No. 721 of the Corporation of the Town of Uxbridge; By-law No. 503 of the Township of Eldon, covering the Police Village of Kirkfield; By-law No. 775 of the Corporation of the Village of Port Perry; By-law No. 20 of 1919 of the Township of Artemesia, covering the Police Village of Priceville; By-law No. 7 of 1919 of the Corporation of the Village of Lucknow; By-law No. 10 of 1919 of the Corporation of the Village of Teeswater; By-law No. 817 of the Corporation of the Town of Wingham; By-law No. 603 of the Corporation of the Town of Kindersley; By-law No. 448 of the Corporation of the Village of Norwood; By-law No. 269 of the Corporation of the Village of Havelock; By-law No. 565 of the Corporation of the Village of Lakefield; By-law No. 389 of the Corporation of the Village of Lancaster; By-law No. 352 of the Corporation of the Village of Chippawa; By-law No. 1 of 1919 of the Corporation of the Township of Stamford; By-law No. 2 of 1919 of the Corporation of the Township of Stamford; and all debentures issued or to be issued or purporting to be issued, under any of the said by-laws which authorize the issue of debentures, are confirmed and declared to be legal, valid and binding upon such corporations and the ratepayers thereof, respectively, and shall not be open to question upon any ground

whatsoever, notwithstanding the requirements of *The Power Commission Act*, or the amendments thereto, or any other Act of this Legislature.

Certain corporations added as parties to contract with Commission.

7. The Municipal Corporation of the Town of Port Colborne, the Municipal Corporation of the Town of Niagara, the Municipal Corporation of the Village of Glencoe, the Municipal Corporation of the Village of Markham, the Municipal Corporation of the Township of Ancaster, the Municipal Corporation of the Township of London, are added as parties of the second part to the contract set out in schedule "A" to *The Power Commission Act, 1909*, as varied, confirmed and amended by the Act passed in the tenth year of the reign of His Late Majesty King Edward VII, chaptered 16 and by subsequent Acts, and by this Act, and the said contract shall be binding upon the parties thereto respectively, as to the Town of Port Colborne from the 22nd January, 1920; as to the Town of Niagara from the 14th April, 1919; as to the Village of Glencoe from the 14th October, 1919; as to the Village of Markham from the 7th March, 1919; as to the Township of Ancaster from the 11th April, 1919; and as to the Township of London from the 10th May, 1919.

Names of municipalities added to schedule.

8. The names of the said municipalities are added to schedule "B" of the said contract, and such schedule shall be read as containing the particulars set out in schedule "A" to this Act.

Contracts confirmed.

9. The agreements set out in schedules "B," "C," "D," "E," "F," "G" and "H" between the Town of Carleton Place, the Town of Alexandria, the Village of Maxville, the Township of Eldon, the Township of Scott, the Board of Water Commissioners of the Municipal Corporation of the Town of Lindsay, the Municipal Corporation of the Village of Lancaster, and the Commission are hereby confirmed and declared to be legal, valid and binding upon the parties thereto, respectively, and shall not be open to question upon any grounds whatsoever, notwithstanding the requirements of *The Power Commission Act* or amendments thereto or any other Act of this Legislature.

Contracts confirmed.

10. The agreements set out in schedules "I," "J" and "K," between the Corporation of the Village of Lakefield, the Corporation of the Village of Havelock, the Corporation of the Village of Norwood, the Corporation of the Town of Uxbridge, the Police Village of Kirkfield, the Village of Port Perry, the Corporation of the Town of Wingham, the Village of Lucknow, the Village of Teeswater, the Police Village of Priceville, the Police Village of Ripley, and the Commission are hereby confirmed and declared to be legal, valid and binding upon the parties thereto, respectively, and shall not be open to question upon any grounds whatsoever, notwithstanding the requirements of *The Power Commission Act* or amendments thereto, or any other Act of this Legislature.

Commencement of Act.

11. This Act shall come into force and take effect on the day upon which it receives the Royal Assent.

SCHEDULE "A."

Name of Municipal Corporation.	Quantity of Power Applied for in H.P.	Maximum Price of Power at Niagara Falls.	Number of Volts.	Estimate maximum cost of power ready for distribution in municipality.		
Port Colborne	150	....	\$21 00	\$8,256 00	\$789 00	
Niagara	150	....	28 00	16,236 00	1,163 00	
Markham	60	....	48 62	18,350 00	973 00	
Glencoe	75	....	78 35	39,804 00	2,312 00	
London Tp.	25	....	(note)	.....	.....
Ancaster Tp.	50	....	25 81	5,089 00	464 00	

NOTE.—(Re London Township.)

The cost of power shall be \$21 per horse-power, plus cost of transmitting such power from the Commission's nearest high tension station to the point of delivery.

This Agreement dated the 22nd day of January, 1920.

Between

Hydro-Electric Power Commission of Ontario, herein called the "Commission," party of the first part;

and

Municipal Corporation of the Town of Port Colborne, herein called the "Corporation," party of the second part.

Whereas the City of Toronto and other municipalities named in column 1 of the schedule of the agreement dated 4th May, 1908, hereto attached and marked "A" have agreed with the Commission for a supply of power from Niagara Falls;

And whereas the Corporation under the provisions of *The Power Commission Act* and amendments thereto, Revised Statutes of Ontario, Chapter 39, has applied to the Commission for a supply of power, and has passed a By-law No. 38, passed the 26th day of August, 1919, to authorize the execution of an agreement therefor.

Now this indenture witnesseth that in consideration of the premises the Commission agrees to supply to the Corporation one hundred and fifty (150) horse power of electrical power upon the terms and conditions set forth in

said agreement of 4th May, 1908, and the Corporation agrees with the Commission upon the said terms and conditions therein set out; Provided that the said terms and conditions may be modified pursuant to Paragraph 11 of the said agreement, but subject to such modifications, the Corporation shall be deemed to have been a party to the said agreement, and the figures set forth in the columns of the schedule of the said agreement hereto attached opposite the name of the Town of Port Colborne shall be deemed to have been inserted therein at the date thereof.

In witness whereof the Commission and the Corporation have respectively affixed their corporate seals and the hands of their proper officers.

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.

(Sgd.) I. B. LUCAS, *Vice-Chairman,*
(Seal)

(Sgd.) W. W. POPE, *Secretary.*

CORPORATION OF THE TOWN OF PORT COLBORNE.

(Sgd.) A. D. CROSS, *Mayor.*
(Seal)

(Sgd.) DAVE ALAIR, *Clerk.*

This Indenture made the 4th day of May, 1908.

Between

The Hydro-Electric Power Commission of Ontario, acting herein on its own behalf and with the approval of the Lieutenant-Governor in Council (hereinafter called the Commission), party of the first part;

and

The Municipal Corporations of Toronto, London, Guelph, Stratford, St. Thomas, Woodstock, Berlin, Galt, Hespeler, St. Mary's, Preston, Waterloo, New Hamburg, and Ingersoll (hereinafter called the Corporations), parties of the second part.

Whereas, pursuant to an Act to provide for transmission of electrical power to municipalities, the Corporations applied to the Commission to transmit and supply such power from Niagara Falls, and the Commission entered into contracts, hereto attached, with the Ontario Power Company of Niagara Falls (hereinafter called the Company), for such power at the prices set forth in the schedule, hereto attached, and the Commission furnished the Corporations with estimates, as shown in the schedules of the total cost of power, ready for distribution within the limits of the Corporations, and the electors of the Corporations assented to By-laws authorizing the Corporations to enter into a contract with the Commission for such power, and the Commission have estimated the line loss and the cost to construct, operate, maintain, repair, renew and insure a line to transmit, nominally, 30,000 horse power with a total capacity of 60,000 horse power of such power to the Corporations, and have apportioned the part of such cost to be paid by each Corporation as shown in said schedule;

Now, therefore, this indenture witnesseth that in consideration of the premises and of the agreements of the Corporations herein set forth, subject to the provisions of said Act of the said contracts, the Commission agrees with the Corporations respectively:—

1.—(a) To construct a line to transmit the quantities of electric power, shown in column 2 of the said schedule, from Niagara Falls to the Corporations shown in column 1, respectively.

(b) On the 1st day of May, 1920, or on any earlier day on which the Commission shall be prepared to supply the same, to supply said power in quantities set forth in column 2 of said schedule, or as a minimum 40 per cent. less, if written notice of minimum required is given on or before 19th July, 1909, to the Corporations within the limits thereof, ready for distribution at approximately the number of volts set forth in column 4 of said schedule, and approximately 25 cycles per second frequency.

(c) At the expiration of three months' written notice, which may be given by the Corporations or any of them from time to time during the continuance of this agreement, to supply from time to time to the Corporations in blocks of not less than 1,000 horse power each, additional power until the total amount so supplied shall amount to 30,000 horse power.

(d) At the expiration of nine months' like notice which may be given by the Corporations or any of them from time to time during the continuance of this agreement, to supply from time to time to the Corporations in blocks of not less than 1,000 horse power each, additional power until the total amount so supplied shall amount to 100,000 horse power.

(e) To use at all times first-class, modern, standard, commercial apparatus and plant and to exercise all due skill and diligence so as to secure the most perfect operation of the plant and apparatus of the Corporations.

In consideration of the premises and of the agreements herein set forth each of the Corporations for itself, and not one for the other, agrees with the Commission:—

2.—(a) Subject to the provisions of paragraph 2 (g), hereof, to pay the Commission for the quantities of power shown in column 2 of said schedule, or 40 per cent. less as a minimum, to be supplied at said date, and for such additional power supplied or held in reserve upon such notices, the price set forth in column 3 of said schedule in twelve monthly payments, in gold coin of the present standard of weight and fineness, and bills shall be rendered by the Commission on or before the fourth and paid by the Corporation on or before the fifteenth of each month. If any bill remains unpaid for fifteen days, the Commission may, in addition to all other remedies and without notice, discontinue the supply of such power to the Corporations in default until said bill is paid. No such discontinuance shall relieve the Corporation in default from the performance of covenants, provisoies, and conditions therein contained. All payments in arrears shall bear interest at the legal rate.

(b) To take electric power exclusively from the Commission during the continuance of this agreement; provided, if the Commission is unable to supply said power as quickly as required, the Corporations may obtain the supply otherwise until the Commission has provided such supply, thereupon the Corporations shall immediately take from the Commission; and the Corporations may generate, store or accumulate electric power for emergencies, or to keep down the peak load of the power taken from the Commission; and nothing herein contained shall affect existing contracts between the Cor-

porations and other parties for a supply of electric power, but the Corporations shall determine said contracts at the earliest date possible.

(c) To pay, annually, interest upon its proportionate part of the moneys expended by the Commission on capital account for the construction of the said line, transformer stations and other necessary works shown, respectively, in column 6 of said schedule, subject to adjustment under paragraph 10.

(d) To pay an annual sum for its proportionate part of the cost of the construction of said line, stations and works, shown, respectively, in column 6 of said schedule, subject to adjustment under paragraph 10, so as to form in thirty years a sinking fund for the retirement of the securities to be issued by the Province of Ontario.

(e) To bear its proportionate part of the line loss and pay its proportionate part of the cost to operate, maintain, repair, renew and insure the said line, stations and works, shown, respectively, in column 7 of said schedule, subject to adjustment under paragraph 10.

(f) To keep, observe and perform the covenants, provisoies and conditions set forth in said contracts, intended by the Commission and the Company to be kept and observed and performed by the Corporations.

(g) To pay for three-fourths of the power supplied and held in reserve at said date upon said notices, whether the said power is taken or not, and when the greatest amount of power taken for twenty consecutive minutes in any month shall exceed three-fourths of the amount during such twenty consecutive minutes, so supplied and held in reserve, to pay for this greater amount during that entire month. When the power factor of the greatest amount of power taken for said twenty minutes falls below 90 per cent. the Corporation shall pay for 90 per cent. of said power divided by the power factor.

(h) To take no more power than the amount to be supplied and held in reserve at said date and upon said notices.

(i) To use at all times first-class, modern, standard, commercial apparatus and plant to be approved by the Commission.

(j) To exercise all due skill and diligence so as to secure the most perfect operation of the plant and apparatus of the Commission and the Company.

3. If, as therein provided, the said contracts are continued until 19th December, 1939, this agreement shall remain in force until that date.

4. Said power shall be three-phase, alternating, commercially continuous twenty-four hour power every day of the year except as provided in paragraph 6 hereof, and shall be measured by curve-drawing meters, subject to test as to accuracy by either party hereto.

5. The engineers of the Commission, or one or more of them, or any other person or persons appointed for this purpose by the Commission, shall have the right from time to time during the continuance of this agreement to inspect the apparatus, plant and property of the Corporations, and take

records at all reasonable times on giving to the Corporation six hours' notice of the intention to make such inspection. The Corporations shall have a like right on giving a like notice to inspect the apparatus plant and property of the Commission.

6. In case the Commission or the Company shall at any time or times be prevented from supplying said power, or any part thereof, or in case the Corporation shall at any time be prevented from taking said power, or any part thereof, by strike, lock-out, riot, fire, invasion, explosion, act of God or the King's enemies, or any other cause reasonably beyond their control, then the Commission shall not be bound to deliver such power during such time and the Corporations shall not be bound to pay the price of said power at Niagara Falls during such time, but the Corporations shall continue to make all other payments, but as soon as the cause of such interruption is removed the Commission shall without any delay supply said power as aforesaid and the Corporations shall take the same and each of the parties hereto shall be prompt and diligent in removing and overcoming such cause or causes of interruption.

7. If, and so often as, any interruption shall occur in the service of the Company due to any cause or causes, other than those provided for by the next preceding paragraph hereof, the Commission shall recover and pay to the Corporations as liquidated and ascertained damages and not by way of penalty, as follows:—For any interruption less than one hour, double the amount payable for power which should have been supplied during the time of such interruption; and for any interruption of one hour or more, the amount payable for the power which should have been supplied during the time of such interruption and twelve times the last mentioned amount in addition thereto, and all moneys payable under this paragraph when the amount thereof is settled between the Commission and the Company may be deducted from any moneys payable by the Corporations to the Commission, but such right of deduction shall not in any case delay the said monthly payments.

8. The maintenance by the Commission of approximately the agreed voltage at approximately the agreed frequency at the sub-station in the limits of the Corporation shall constitute the supply of all power involved herein and the fulfilment of all operating obligations hereunder; and when voltage and frequency are so maintained, the amount of the power, its fluctuation load factor, power factor, distribution as to phases, and all other electric characteristics and qualities are under the sole control of the Corporations, their agents, customers, apparatus, appliances and circuits.

9. In case any municipal corporation, or any person, firm or corporation which shall contract with the Commission or with any municipal corporation for a supply of power furnished to the Commission by the Company shall suffer damages by the act or neglect of the Company, and such municipal corporation, person, firm or corporation would, if the Company had made the said contracts directly with them, have had a right to recover such damages or commence any proceedings or any other remedy, the Commission shall be entitled to commence any such proceeding or bring such action for or on behalf of such municipal corporation, person, firm, or corporation, and notwithstanding any acts, decision or rule of law to the contrary, the Commission shall be entitled to all the rights and remedies of such municipal corporations, person, firm or corporation, including the right to recover such damages, but no action shall be brought by the Commission until such

municipal corporation, person, firm or corporation shall have agreed with the Commission to pay any costs that may be adjudged to be paid if such proceeding or action is unsuccessful. The rights and remedies of any such municipal corporation, person, firm or corporation, shall not be hereby prejudiced.

10. The Commission shall at least annually adjust and apportion the amounts payable by municipal corporations for such power and such interest, sinking fund, line loss, and cost of operating, maintaining, repairing, renewing and insuring the line and works.

11. If at any time, any other municipal corporation, or pursuant to said Act, any railway or distributing company or any other corporation or person, applies to the Commission for a supply of power, the Commission shall notify the applicant and the Corporations, parties hereto, in writing, of a time and place and hear all representations that may be made as to the terms and conditions for such supply.

Without discrimination in favour of the applicants as to the price to be paid, for equal quantities of power, the Commission may supply power upon such terms and conditions as may, having regard to the risk and expense incurred, and paid, and to be paid by the Corporations, parties hereto, appear equitable to the Commission, and are approved by the Lieutenant-Governor in Council.

No such application shall be granted if the said line is not adequate for such supply, or if the supply of the Corporations, parties hereto, will be thereby injuriously affected, and no power shall be supplied within the limits of a municipal corporation taking power from the Commission at the time of such application, without the written consent of such corporation.

In determining the quantity of power supplied to a municipal corporation, the quantity supplied by the Commission within the limits of the Corporation to any applicant other than a municipal corporation, shall be computed as part of the quantity supplied to such corporation, but such corporation shall not be liable to pay for the power so supplied, or otherwise in respect thereof. No power shall be supplied by any municipal corporation to any railway or distributing company, or any other corporation or person without the written consent of the Commission.

12. It is hereby declared that the Commission is to be a trustee of all property held by the Commission under this agreement for the Corporations and other municipal corporations supplied by the Commission, but the Commission shall be entitled to a lien upon said property for all moneys expended by the Commission under this agreement and not repaid. At the expiration of this agreement the Commission shall determine and adjust the rights of the Corporations and other municipal corporations, supplied by the Commission, having regard to the amounts paid by them, respectively, under the terms of this agreement, and such other considerations as may appear equitable to the Commission and are approved by the Lieutenant-Governor in Council.

13. Each of the Corporations agrees with the other:—

(a) To take electric power exclusively from the Commission during the continuance of this agreement, subject to the proviso above set forth in paragraph 2 (b).

(b) To co-operate, by all means in its power, at all times, with the Commission to increase the quantity of power required from the Commission,

and in all other respects to carry out the objects of this agreement and of the said Act.

14. If differences arise between the Corporations, the Commission may upon application fix a time and place to hear all representations that may be made by the parties and the Commission shall, in a summary manner, when possible, adjust such differences and such adjustment shall be final. The Commission shall have all the powers that may be conferred upon a Commissioner appointed under *The Act respecting Enquiries concerning Public Matters.*

15. This agreement shall extend to, be binding upon and enure to the benefit of the successors and assigns of the parties hereto.

In witness whereof the Commission and the Corporation have, respectively, affixed their corporate Seals and the hands of their proper officers.

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO,
Commissioners.

SCHEDULE.

SCHEDULE "B."

This Indenture made in duplicate the 15th day of April in the year of our Lord one thousand nine hundred and nineteen (1919).

Between

The Hydro-Electric Power Commission of Ontario, hereinafter called the "Commission," party of the first part,

and

The Municipal Corporation of the Town of Carleton Place, hereinafter called the "Corporation," party of the second part.

Whereas, the Corporation under the provisions of *The Power Commission Act* and amendments thereto, Revised Statutes of Ontario, Chapter 39, has applied to the Commission for a supply of power and has passed a By-law No. 796, passed the 6th day of January, to authorize the execution of an agreement therefor;

And whereas in accordance with powers conferred by Legislature, upon the Commission by the said Act and amendments thereto, the Commission intends either to purchase, acquire or construct generating stations, hydraulic plants, lines, sub-stations and all works in connection therewith required for the purpose of supplying power hereunder, or to enter into an agreement with one or more power generating companies or individuals for a supply of power required hereunder, and to construct the necessary stations, plant, lines and equipment to transmit, transform and deliver power to the Corporation;

Now therefore this indenture witnesseth that in consideration of the premises and of the agreement of the Corporation herein set forth, subject to the provisions of the said Act and amendments thereto, the parties hereto agree each with the other as follows:

1. The Commission agrees:

(a) To reserve and deliver at the earliest possible date eight hundred (800) horse power, or more, of electrical power to the Corporation.

(b) At the expiration of reasonable notice, in writing, which may be given by the Corporation from time to time during the continuance of this agreement, to reserve and deliver to the Corporation additional electric power when called for.

(c) To use at all times first-class, modern, standard commercial apparatus and plant, and to exercise all due skill and diligence so as to secure the satisfactory operation of the plant and apparatus of the Corporation.

(d) To deliver commercially continuous twenty-four (24) hour power every day in the year to the Corporation at the distribution bus bars in the Commission's sub-station within the Corporation's limits.

2. The Corporation agrees:

(a) To use all diligence by every lawful means in its power to prepare for the receipt and use of the power dealt with by this agreement so as to be able to receive power when the Commission is ready to deliver same.

(b) To pay annually in twelve (12) equal monthly instalments, interest upon its proportionate part (based on the quantity of electrical energy or power taken), of all moneys expended by the Commission on capital account for the acquiring of properties and rights, the acquiring and construction of generating plants, transformer stations, transmission lines, distributing stations, and other works necessary for the delivery of said electrical energy or power to the Corporation under the terms of this contract.

To pay an annual sum for its proportionate part of all moneys expended by the Commission on capital account for the acquiring of the said properties and rights, purchasing of power and the cost of the said construction, so as to form in thirty (30) years a sinking fund for the retirement of securities issued by the Province of Ontario.

Also to bear its proportionate part of the line loss and pay its proportionate part of the costs to operate, maintain, repair, renew and insure the said generating plants, transformer stations, transmission lines, distributing stations, and other necessary works.

All payments under this clause shall be subject to adjustment under paragraph 6.

(c) The amounts payable in accordance with clause 2 (b) shall be paid in gold coin of the present standard of weight and fineness, at the offices of the Commission at Toronto. Bills shall be rendered by the Commission on or before the 5th day and paid by the Corporation on or before the 15th day of each month. If any bills remain unpaid for fifteen days the Commission may, in addition to all other remedies and without notice, discontinue the supply of power to the Corporation until said bill is paid. No such discontinuance shall relieve the corporation from the performance of the covenants, provisoos and conditions herein contained. All payments in arrears shall bear interest at the legal rate.

(d) To take power exclusively from the Commission during the continuance of this agreement.

(e) To pay for three-fourths of the power ordered from time to time by the Corporation and held in reserve for it as herein provided, whether it takes the same or not. When the highest average amount of power taken for any twenty consecutive minutes during any month exceeds during the twenty consecutive minutes three-fourths of the amount ordered by the Corporation and held in reserve, then the Corporation shall pay for this greater amount during the entire month.

If the Corporation during any month takes more than the amount of power ordered and held in reserve for it, as determined by an integrated peak, or the highest average, for a period of twenty consecutive minutes, the taking of such excess shall thereafter constitute an obligation on the part of the Corporation to pay for, and on the part of the Commission to hold in reserve, such increased quantity of power in accordance with the terms and conditions of this contract.

(f) To take and use the three-phase power at all times in such manner that the power factor, i.e., the ratio of the kilowatts to the kilovolt-

amperes is a maximum, but, in any event, the corporation shall pay for 90 per cent. of the maximum kilovolt-amperes considered as true power factor or kilowatts. The maximum in kilovolt-amperes or kilowatts shall be taken as the maximum average or integrated demand over any twenty consecutive minutes.

(g) To use at all times first-class, modern, standard commercial apparatus and plant, to be approved by the Commission and to exercise all due skill and diligence so as to secure satisfactory operation of the plant and apparatus of the Commission and of the Corporation.

(h) To co-operate by all means in its power at all times with the Commission to increase the quantity of power required from the Commission, and in all other respects to carry out the objects of this agreement, and of the said Act.

3. This agreement shall remain in force for thirty (30) years from the date of the first delivery of power under this contract.

4. The power shall be alternating, three-phase, having a periodicity of approximately 60 cycles per second, and shall be delivered as aforesaid at a voltage suitable for local distribution.

5. The engineers of the Commission, or one or more of them, or any other person or persons appointed for this purpose by the Commission, shall have the right from time to time, during the continuance of this agreement, to inspect the apparatus, plant, and property of the Corporation, and take records at all reasonable hours.

6. The Commission shall at least annually adjust and apportion the amount or amounts payable by the Municipal Corporation or Corporations for such power and such interest, sinking fund, cost of lost power and cost of generating, operating, maintaining, repairing, renewing and insuring said works.

7. It is hereby declared that the Commission is to be a trustee of all property held by the Commission under this agreement for the Corporation and other municipal corporations supplied by the Commission, but the Commission shall be entitled to a lien upon said property for all moneys expended by the Commission under this agreement and not repaid. At the expiration of this agreement the Commission shall determine and adjust the rights of the Corporation and other municipal corporations supplied by the Commission, having regard to the amounts paid by them, respectively under the terms of this agreement, and such other considerations as may appear equitable to the Commission and are approved by the Lieutenant-Governor in Council.

8. If at any time any other municipal corporation, or pursuant to said Act, any railway or distributing company, or any other corporation or person, applies to the Commission for a supply of power, the Commission shall notify the applicant and the Corporation, in writing, of a time and place to hear all representations that may be made as to the terms and conditions for such supply.

Without discrimination in favour of the applicants as to the price to be paid, for equal quantities of power, the Commission may supply power

upon such terms and conditions as may, having regard to the risk and expense incurred and paid, and to be paid by the Corporation, appear equitable to the Commission, and are approved by the Lieutenant-Governor in Council.

No such application shall be granted if the said works, or any part thereof, are not adequate for such supply, or if the supply of the Corporation will be thereby injuriously affected, and no power shall be supplied within the limits of a municipal corporation taking power from the Commission at the time of such application, without the written consent of such Corporation.

In determining the quantity of power supplied to a municipal corporation, the quantity supplied by the Commission within the limits of the Corporation to any applicant, other than a municipal corporation, shall be computed as part of the quantity supplied to such Corporation, but such Corporation shall not be liable for payment for any portion of the power so supplied. No power shall be supplied by the municipal corporation to any railway or distributing company, without the written consent of the Commission, but the Corporation may sell power to any person or persons, or manufacturing companies within the limits of the Corporation, but such power shall not be sold for less than cost, neither shall there be any discrimination as regards price and quantity.

9. If differences arise between corporations to which the Commission is supplying power, the Commission may, upon application, fix a time and place and hear all representations that may be made by the parties, and the Commission shall, in a summary manner, when possible, adjust such differences, and such adjustments shall be final. The Commission shall have all the powers that may be conferred upon a commissioner appointed under *The Act respecting Enquiries concerning Public Matters*.

10. This agreement shall extend to, be binding upon, and enure to the benefit of the successors and assigns of the parties hereto.

In witness whereof the Commission and the Corporation have respectively affixed their corporate seals and the hands of their proper officers.

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO,

(Sgd.) A. BECK, *Chairman.*

(Seal)

(Sgd.) W. W. POPE, *Secretary.*

MUNICIPAL CORPORATION OF THE TOWN OF CARLETON PLACE.

(Sgd.) R. W. BATES, *Mayor.*

(Seal)

(Sgd.) A. R. G. PEDEN, *Clerk.*

SCHEDULE "C."

This Indenture, made in duplicate the 26th day of January, in the year of our Lord, one thousand nine hundred and twenty (1920).

Between

The Hydro-Electric Power Commission of Ontario, hereinafter called the "Commission," party of the first part,

and

The Municipal Corporation of the Town of Alexandria, hereinafter called the "Corporation," party of the second part.

Whereas the Corporation, under the provisions of *The Power Commission Act* and amendments thereto, Revised Statutes of Ontario, Chapter 39, has applied to the Commission for a supply of power and has passed a by-law No. 320, passed the first day of December, 1919, to authorize the execution of an agreement therefor.

And whereas in accordance with the powers conferred by Legislature, upon the Commission by the said Act and amendments thereto, the Commission intends either to purchase, acquire or construct generating stations, hydraulic plants, lines, sub-stations and all works in connection therewith required for the purpose of supplying power hereunder, or to enter into an agreement with one or more power generating companies or individuals for a supply of power required hereunder, and to construct the necessary stations, plant, lines and equipment to transmit, transform and deliver power to the Corporation;

Now therefore this indenture witnesseth that in consideration of the premises and of the agreement of the Corporation herein set forth, subject to the provisions of the said Act and amendments thereto, the parties hereto agree each with the other as follows:

1. The Commission agrees:

(a) To reserve and deliver at the earliest possible date three hundred (300) horse power, or more, of electrical power to the Corporation.

(b) At the expiration of reasonable notice, in writing, which may be given by the Corporation from time to time during the continuance of this agreement, to reserve and deliver to the Corporation additional electric power when called for.

(c) To use at all times first-class, modern, standard commercial apparatus and plant, and to exercise all due skill and diligence so as to secure the satisfactory operation of the plant and apparatus of the Corporation.

(d) To deliver commercially continuous twenty-four (24) hour power every day in the year to the Corporation at the distribution bus bars in the Commission's sub-station within the Corporation's limits.

2. The Corporation agrees:

(a) To use all diligence by every lawful means in its power to prepare for the receipt and use of the power dealt with by this agreement so as to be able to receive power when the Commission is ready to deliver same.

(b) To pay annually in twelve (12) equal monthly instalments, interest upon its proportionate part (based on the quantity of electrical energy or power taken), of all moneys expended by the Commission on capital account for the acquiring of properties and rights, the acquiring and construction of generating plants, transformer stations, transmission lines, distributing stations, and other works necessary for the delivery of said electrical energy or power to the Corporation under the terms of this contract.

To pay an annual sum for its proportionate part of all moneys expended by the Commission on capital account for the acquiring of the said properties and rights, purchasing of power and the cost of the said construction, so as to form in thirty (30) years a sinking fund for the retirement of securities issued by the Province of Ontario.

Also to bear its proportionate part of the line loss and pay its proportionate part of the costs to operate, maintain, repair, renew and insure the said generating plants, transformer stations, transmission lines, distributing stations, and other necessary works.

All payments under this clause shall be subject to adjustment under paragraph 6.

(c) The amounts payable in accordance with clause 2 (b) shall be paid in gold coin of the present standard of weight and fineness, at the offices of the Commission at Toronto. Bills shall be rendered by the Commission on or before the 5th day and paid by the Corporation on or before the 15th day of each month. If any bills remain unpaid for fifteen days the Commission may, in addition to all other remedies and without notice, discontinue the supply of power to the Corporation until said bill is paid. No such discontinuance shall relieve the corporation from the performance of the covenants, provisoies and conditions herein contained. All payments in arrears shall bear interest at the legal rate.

(d) To take power exclusively from the Commission during the continuance of this agreement.

(e) To pay for three-fourths of the power ordered from time to time by the Corporation and held in reserve for it as herein provided, whether it takes the same or not. When the highest average amount of power taken for any twenty consecutive minutes during any month exceeds during the twenty consecutive minutes three-fourths of the amount ordered by the Corporation and held in reserve, then the Corporation shall pay for this greater amount during the entire month.

If the Corporation during any month takes more than the amount of power ordered and held in reserve for it, as determined by an integrated peak, or the highest average, for a period of twenty consecutive minutes, the taking of such excess shall thereafter constitute an obligation on the part of the Corporation to pay for, and on the part of the Commission to hold in reserve, such increased quantity of power in accordance with the terms and conditions of this contract.

(f) To take and use the three-phase power at all times in such manner that the power factor, i.e., the ratio of the kilowatts to the kilovolt-amperes is a maximum, but, in any event, the corporation shall pay for

90 per cent. of the maximum kilovolt-amperes considered as true power factor or kilowatts. The maximum in kilovolt-amperes or kilowatts shall be taken as the maximum average or integrated demand over any twenty consecutive minutes.

(g) To use at all times first-class, modern, standard commercial apparatus and plant, to be approved by the Commission and to exercise all due skill and diligence so as to secure satisfactory operation of the plant and apparatus of the Commission and of the Corporation.

(h) To co-operate by all means in its power at all times with the Commission to increase the quantity of power required from the Commission, and in all other respects to carry out the objects of this agreement, and of the said Act.

3. This agreement shall remain in force for thirty (30) years from the date of the first delivery of power under this contract.

4. The power shall be alternating, three-phase, having a periodicity of approximately 60 cycles per second, and shall be delivered as aforesaid at a voltage suitable for local distribution.

5. The engineers of the Commission, or one or more of them, or any other person or persons appointed for this purpose by the Commission, shall have the right from time to time, during the continuance of this agreement, to inspect the apparatus, plant, and property of the Corporation, and take records at all reasonable hours.

6. The Commission shall at least annually adjust and apportion the amount or amounts payable by the Municipal Corporation or Corporations for such power and such interest, sinking fund, cost of lost power and cost of generating, operating, maintaining, repairing, renewing and insuring said works.

7. It is hereby declared that the Commission is to be a trustee of all property held by the Commission under this agreement for the Corporation and other municipal corporations supplied by the Commission, but the Commission shall be entitled to a lien upon said property for all moneys expended by the Commission under this agreement and not repaid. At the expiration of this agreement the Commission shall determine and adjust the rights of the Corporation and other municipal corporations supplied by the Commission, having regard to the amounts paid by them, respectively under the terms of this agreement, and such other considerations as may appear equitable to the Commission and are approved by the Lieutenant-Governor in Council.

8. If at any time any other municipal corporation, or pursuant to said Act, any railway or distributing company, or any other corporation or person, applies to the Commission for a supply of power, the Commission shall notify the applicant and the Corporation, in writing, of a time and place to hear all representations that may be made as to the terms and conditions for such supply.

Without discrimination in favour of the applicants as to the price to be paid, for equal quantities of power, the Commission may supply power

upon such terms and conditions as may, having regard to the risk and expense incurred and paid, and to be paid by the Corporation, appear equitable to the Commission, and are approved by the Lieutenant-Governor in Council.

No such application shall be granted if the said works, or any part thereof, are not adequate for such supply, or if the supply of the Corporation will be thereby injuriously affected, and no power shall be supplied within the limits of a municipal corporation taking power from the Commission at the time of such application, without the written consent of such Corporation.

In determining the quantity of power supplied to a municipal corporation, the quantity supplied by the Commission within the limits of the Corporation to any applicant, other than a municipal corporation, shall be computed as part of the quantity supplied to such Corporation, but such Corporation shall not be liable for payment for any portion of the power so supplied. No power shall be supplied by the municipal corporation to any railway or distributing company, without the written consent of the Commission, but the Corporation may sell power to any person or persons, or manufacturing companies within the limits of the Corporation, but such power shall not be sold for less than cost, neither shall there be any discrimination as regards price and quantity.

9. If differences arise between corporations to which the Commission is supplying power, the Commission may, upon application, fix a time and place and hear all representations that may be made by the parties, and the Commission shall, in a summary manner, when possible, adjust such differences, and such adjustments shall be final. The Commission shall have all the powers that may be conferred upon a commissioner appointed under *The Act respecting Enquiries concerning Public Matters*.

10. This agreement shall extend to, be binding upon, and enure to the benefit of the successors and assigns of the parties hereto.

In witness whereof the Commission and the Corporation have respectively affixed their corporate seals and the hands of their proper officers.

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO,

(Sgd.) I. B. LUCAS, *Vice-Chairman.*

(Seal)

(Sgd.) W. W. POPE, *Secretary.*

MUNICIPAL CORPORATION OF THE VILLAGE OF ALEXANDRIA.

(Sgd.) GEO. SIMON, *Mayor.*

(Seal)

(Sgd.) S. MACDONELL, *Clerk.*

SCHEDULE "D."

This Indenture, made in duplicate the 26th day of January in the year of our Lord, one thousand nine hundred and twenty (1920).

Between

The Hydro-Electric Power Commission of Ontario, hereinafter called the "Commission," party of the first part,

and

The Municipal Corporation of the Village of Maxville, hereinafter called the "Corporation," party of the second part.

Whereas the Corporation, under the provisions of *The Power Commission Act* and amendments thereto, Revised Statutes of Ontario, Chapter 39, has applied to the Commission for a supply of power and has passed a By-law No. 413, passed the 12th day of January to authorize the execution of an agreement therefor;

And whereas in accordance with the powers conferred by Legislature upon the Commission by the said Act and amendments thereto, the Commission intends either to purchase, acquire, or construct generating stations, hydraulic plants, lines, substations and all works in connection therewith required for the purpose of supplying power hereunder, or to enter into an agreement with one or more power generating companies or individuals for a supply of power required hereunder, and to construct the necessary stations, plant, lines and equipment to transmit, transform and deliver power to the Corporation.

Now therefore this indenture witnesseth that in consideration of the premises and of the agreement of the Corporation herein set forth, subject to the provisions of the said Act and amendments thereto, the parties hereto agree each with the other as follows:

1. The Commission agrees:

(a) To reserve and deliver at the earliest possible date seventy-five (75) horse power, or more, of electrical power to the Corporation.

(b) At the expiration of reasonable notice, in writing, which may be given by the Corporation from time to time during the continuance of this agreement, to reserve and deliver to the Corporation additional electric power when called for.

(c) To use at all times first-class, modern, standard commercial apparatus and plant, and to exercise all due skill and diligence so as to secure the satisfactory operation of the plant and apparatus of the Corporation.

(d) To deliver commercially continuous twenty-four (24) hour power every day in the year to the Corporation at the distribution bus bars in the Commission's substation within the Corporation's limits.

2. The Corporation agrees:

(a) To use all diligence by every lawful means in its power to prepare for the receipt and use of the power dealt with by this agreement so as to be able to receive power when the Commission is ready to deliver same.

(b) To pay annually in twelve (12) equal monthly instalments interest upon its proportionate part (based on the quantity of electrical energy or power taken) of all moneys expended by the Commission on capital account for the acquiring of properties and rights, the acquiring and construction of generating plants, transformer stations, transmission line, distributing stations, and other works necessary for the delivery of said electrical energy or power to the Corporation under the terms of this contract;

To pay an annual sum for its proportionate part of all moneys expended by the Commission on capital account for the acquiring of the said properties and rights, purchasing of power and the cost of the said construction, so as to form in thirty (30) years a sinking fund for the retirement of securities issued by the Province of Ontario;

Also to bear its proportionate part of the line loss and pay its proportionate part of the cost to operate, maintain, repair, renew and insure the said generating plants, transformer stations, transmission lines, distributing stations, and other necessary works.

All payments under this clause shall be subject to adjustment under paragraph 6.

(c) The amounts payable in accordance with clause (2) (b) shall be paid in gold coin of the present standard of weight and fineness, at the offices of the Commission at Toronto. Bills shall be rendered by the Commission on or before the 5th day and paid by the Corporation on or before the 15th day of each month. If any bills remain unpaid for fifteen days the Commission may, in addition to all other remedies and without notice, discontinue the supply of power to the Corporation until said bill is paid. No such discontinuance shall relieve the Corporation from the performance of the covenants, provisoos, and conditions herein contained. All payments in arrears shall bear interest at the legal rate.

(d) To take power exclusively from the Commission during the continuance of this agreement.

(e) To pay for three-fourths of the power ordered from time to time by the Corporation and held in reserve for it as herein provided, whether it takes the same or not. When the highest average amount of power taken for any twenty consecutive minutes during any month exceeds during the twenty consecutive minutes three-fourths of the amount ordered by the Corporation and held in reserve, the Corporation shall pay for this greater amount during the entire month.

If the Corporation during any month takes more than the amount of power ordered and held in reserve for it, as determined by an integrated peak, or the highest average, for a period of twenty consecutive minutes, the taking of such excess shall thereafter constitute an obligation on the part of the Corporation to pay for, and on the part of the Commission to hold in reserve, such increased quantity of power in accordance with the terms and conditions of this contract.

(f) To take and use the three-phase power at all times in such manner that the power factor, i.e., the ratio of the kilowatts to the kilovolt-amperes is a maximum, but, in any event, the Corporation shall pay for 90 per cent. of the maximum kilovolt-amperes considered as true power factor or

kilowatts. The maximum in kilovolt-amperes or kilowatts shall be taken as the maximum average or integrated demand over any twenty consecutive minutes.

(g) To use at all times first-class, modern, standard commercial apparatus and plant, to be approved by the Commission and to exercise all due skill and diligence so as to secure satisfactory operation of the plant and apparatus of the Commission and of the Corporation.

(h) To co-operate by all means in its power at all times with the Commission to increase the quantity of power required from the Commission and in all respects to carry out the objects of this agreement and of the said Act.

3. This agreement shall remain in force for thirty (30) years from the date of the first delivery of power under this contract.

4. The power shall be alternating, three-phase, having a periodicity of approximately 60 cycles per second, and shall be delivered as aforesaid at a voltage suitable for local distribution.

5. The engineers of the Commission, or one or more of them, or any other person or persons appointed for this purpose by the Commission shall have the right from time to time during the continuance of this agreement to inspect the apparatus, plant, and property of the Corporation, and take records at all reasonable hours.

6. The Commission shall at least annually adjust and apportion the amount or amounts payable by the Municipal Corporation or Corporations for such power and such interest, sinking fund, cost of lost power and cost of generating, operating, maintaining, repairing, renewing and insuring said works.

7. It is hereby declared that the Commission is to be a trustee of all property held by the Commission under this agreement for the Corporation and other municipal corporations supplied by the Commission, but the Commission shall be entitled to a lien upon said property for all moneys expended by the Commission under this agreement and not repaid. At the expiration of this agreement the Commission shall determine and adjust the rights of the Corporation and other municipal corporations, supplied by the Commission, having regard to the amounts paid by them respectively under the terms of this agreement, and such other considerations as may appear equitable to the Commission and are approved by the Lieutenant-Governor in Council.

8. If at any time any other municipal corporation, or pursuant to said Act, any railway or distributing company, or any other corporation or person, applies to the Commission for a supply of power, the Commission shall notify the applicant and the Corporation, in writing, of a time and place to hear all representations that may be made as to the terms and conditions for such supply.

Without discrimination in favour of the applicants as to the price to be paid, for equal quantities of power, the Commission may supply power upon such terms and conditions as may, having regard to the risk and expense incurred, and paid, and to be paid by the Corporation, appear equitable to the Commission, and are approved by the Lieutenant-Governor in Council.

No such application shall be granted if the said works, or any part thereof, are not adequate for such supply, or if the supply of the Corporation will be thereby injuriously affected, and no power shall be supplied within the limits of a municipal corporation taking power from the Commission at the time of such application, without the written consent of such Corporation.

In determining the quantity of power supplied to a municipal corporation, the quantity supplied by the Commission within the limits of the Corporation to any applicant, other than a municipal corporation, shall be computed as part of the quantity supplied to such Corporation, but such Corporation shall not be liable for payment for any portion of the power so supplied. No power shall be supplied by the municipal corporation to any railway or distributing company, without the written consent of the Commission, but the Corporation may sell power to any person or persons, or manufacturing companies within the limits of the Corporation, but such power shall not be sold for less than cost, neither shall there be any discrimination as regards price and quantity.

9. If differences arise between corporations to which the Commission is supplying power, the Commission may, upon application, fix a time and place and hear all representations that may be made by the parties, and the Commission shall, in a summary manner, when possible, adjust such differences, and such adjustments shall be final. The Commission shall have all the powers that may be conferred upon a commissioner appointed under *The Act respecting Enquiries concerning Public Matters*.

10. This agreement shall extend to, be binding upon, and enure to the benefit of the successors and assigns of the parties hereto.

In witness whereof the Commission and the Corporation have respectively affixed their Corporate Seals and the hands of their proper officers.

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.

(Sgd.) I. B. LUCAS, *Vice-Chairman.*

(Seal.)

(Sgd.) W. W. POPE, *Secretary.*

MUNICIPAL CORPORATION OF THE VILLAGE OF MAXVILLE.

(Sgd.) A. H. ROBERTSON, *Reeve.*

(Seal.)

(Sgd.) J. W. WEEGAR, *Clerk.*

SCHEDULE "E."

This agreement made this 28th day of November, A.D. 191 .

Between

The Hydro-Electric Power Commission of Ontario, herein called the "Commission," party of the first part,

and

The Municipal Corporation of the Township of Eldon, herein called the "Corporation," party of the second part.

Whereas, pursuant to an Act to provide for the transmission of electrical power to municipalities, the Corporation has applied to the Commission for a supply of power;

And whereas the Corporation under the provisions of *The Power Commission Act* and amendments thereto and *The Power Commission Act of 1911*, being an Act to provide for the local distribution of electrical power, has, at the request of a number of ratepayers (petitioners) applied to the Commission for a supply of electrical power or energy, and has passed a by-law No. 495 to authorize the execution of an agreement therefor.

1. Now therefore this indenture witnesseth that in consideration of the premises and of the agreements of the Corporation set forth, subject to the provisions of the said Act and amendments, the Commission agrees with the Corporation:—

(a) To reserve and deliver at the earliest possible date electrical power to the Corporation as required by the Corporation.

(b) At the expiration of thirty (30) days' notice in writing which may be given by the Corporation from time to time during the continuance of this agreement, to reserve and deliver to the Corporation additional electrical power as may be required from time to time.

(c) To use at all times first class, modern, standard commercial apparatus and plant, and to exercise due skill and diligence so as to secure the most perfect operation of the plant and apparatus of the Corporation.

(d) Power shall be delivered to the Corporation at approximately 2,200 or 4,000 volts, or at any other primary voltage that may be available for the Corporation's use.

(e) To supply and construct all 2,200, 4,000 or other lines at primary voltage made necessary by contracts for electric service made between the Corporation and residents or users, within the township, from the Commission's transformer station or stations to the service transformers of the Corporation, located at such points as the Commission may approve.

2. In consideration of the premises and of the covenants and agreements herein set forth, the Corporation agrees with the Commission:—

(a) To use all diligence by every lawful means in its power to prepare for the receipt and use of the power dealt with by this agreement, so as to be able to give notice as specified in paragraph 1 (b).

(b) Subject to the provisions of paragraph 2 (g) herein, to pay to the Commission monthly, for all power taken, including the charges in connection with the delivery of the power to the municipality as outlined in clauses 2 (c) and (d).

(c) To pay annually, in twelve monthly instalments, interest upon its proportionate part of the moneys expended by the Commission on capital account for the construction of lines, transformer stations and other necessary works for the delivery of power to the Corporation; to pay an annual sum for its proportionate part of the cost of the said construction, so as to form in thirty years a sinking fund for the retirement of the securities issued by the Province of Ontario; and to bear its proportionate part of the line loss and pay its proportionate part of the cost to operate, maintain, repair, renew and insure the said lines, stations and works. All payments under this paragraph shall be subject to adjustment under paragraph 7.

(d) In addition to the cost of power, and the cost of delivering it to the Corporation as provided for in paragraphs 2 (b) and (c), to pay to the Commission in half yearly instalments, interest and sinking fund on a thirty year basis on all capital invested by the Commission in 2,200, 4,000 or other lines of primary voltage as provided for in paragraph 1 (e), and to maintain, repair and operate the said lines, and set aside a fund for renewals at a rate to be fixed by the Commission, on all capital expended by the Commission on such construction.

(e) The amounts payable in accordance with clause 2 (b), (c) and (d) shall be paid in gold coin of the present standard of weight and fineness, at the office of the Commission at Toronto, and bills shall be rendered by the Commission on or before the 5th day and paid by the Corporation on or before the 15th day of each month except that payments under clause 2 (d) shall be made half yearly. If any bills remain unpaid for fifteen days, the Commission may, in addition to all other remedies and without notice, discontinue the supply of power to the Corporation until said bill is paid. No such discontinuance shall relieve the Corporation from the performance of the covenants, provisos and conditions herein contained. All payments in arrears shall bear interest at the legal rate.

(f) To take power exclusively from the Commission during the continuance of this agreement.

(g) To pay for three-fourths of the power ordered from time to time by the Corporation and held in reserve for it as herein provided whether it takes the same or not. When the highest average amount of power taken for any twenty consecutive minutes during any month shall exceed during the twenty consecutive minutes three-fourths of the amount ordered by the Corporation and held in reserve, then the Corporation shall pay for this greater amount during the entire month.

If the Corporation during any month takes more than the amount of power ordered and held in reserve for it, as determined by an integrated peak, or highest average, for a period of twenty consecutive minutes, the Corporation shall pay for this greater amount of power during the entire

month. The taking of such excess shall thereafter constitute an obligation on the part of the Corporation to pay for and on the part of the Commission to hold in reserve an additional block of power in accordance with the terms and conditions of this contract.

When the power factor of the greatest amount of power taken for said twenty consecutive minutes falls below ninety per cent. (90%), the Corporation shall pay for ninety per cent. (90%) of the maximum kilovolt-amperes (considered as true power or kilowatts) when that amount is in excess of the maximum kilowatts taken. The maximum in kilowatts or kilovolt-amperes shall be taken as the maximum average or integrated demand over any twenty (20) consecutive minutes.

(h) To use at all times first-class, modern standard commercial apparatus and plant to be approved by the Commission and to exercise all due skill and diligence so as to secure the most perfect operation of the plant and apparatus of the Commission and of the Company.

(i) To co-operate, by all means in its power, at all times, with the Commission, to increase the quantity of power required from the Commission, and in all other respects to carry out the objects of this agreement and of the said Act.

3. The power shall be three-phase, alternating commercially continuous twenty-four hour power every day of the year except as provided in paragraph 5, having a periodicity of approximately 60 cycles per second, and shall be delivered as aforesaid at a voltage suitable for distribution within the municipality.

(a) That the meters with their series and potential transformers shall be connected at the point of delivery, and shall be subject to test as to accuracy by either party hereto.

(b) The maintenance by the Commission of approximately the agreed voltage at approximately the agreed frequency at the point of delivery to the Corporation shall constitute the supply of all power involved herein and the fulfilment of all operating obligations hereunder; and when voltage and frequency are so maintained, the amount of the power, its fluctuations, load factor, power factor, distribution as to phases, and all other electric characteristics and qualities are under the sole control of the Corporation, their agents, customers, apparatus, appliances and circuits.

4. The engineers of the Commission, or one or more of them, or any other person or persons appointed for this purpose by the Commission, shall have the right from time to time during the continuance of this agreement, to inspect the apparatus, plant and property of the Corporation and take records at all reasonable hours.

.5. In case the Commission should at any time or times be prevented from supplying said power, or any part thereof, or in case the Corporation shall at any time be prevented from taking said power, or any part thereof, by strike, lockout, fire, invasion, explosion, act of God or the King's enemies, or any other cause reasonably beyond their control, then the Commission shall not be bound to deliver such power during such times, and the Corporation shall not be bound to pay the price of said power during such time.

6. The Commission shall at least annually adjust and apportion the amounts payable by municipal corporations for such power and such interest, sinking fund, line loss, and cost of operating, maintaining, repairing, renewing and insuring the line and works.

7. It is hereby declared that the Commission is to be a trustee of all property held by the Commission under this agreement for the Corporation and other municipal corporations supplied by the Commission, but the Commission shall be entitled to a lien upon said property for all moneys expended by the Commission under this agreement and not repaid. At the expiration of this agreement the Commission shall determine and adjust the rights of the Corporation and other municipal corporations, supplied by the Commission, having regard to the amounts paid by them respectively, under the terms of this agreement, and such other considerations, as may appear equitable to the Commission and are approved by the Lieutenant-Governor in Council.

8. If at any time any other municipal corporation, or pursuant to said Act, any railway or distributing company, or any other corporation or person, applies to the Commission for a supply of power, the Commission shall notify the applicant and the Corporation in writing, of a time and place and hear all representations that may be made as to the terms and conditions for such supply.

Without discrimination in favour of the applicants as to the price to be paid for equal quantities of power, the Commission may supply power upon such terms and conditions as may, having regard to the risk and expense incurred and paid, and to be paid by the Corporation, appear equitable to the Commission, and are approved by the Lieutenant-Governor in Council.

9. If differences arise between corporations to whom the Commission is supplying power, the Commission may upon application fix a time and place to hear all representations that may be made by the parties, and the Commission shall, in a summary manner when possible, adjust such differences and such adjustment shall be final.

The Commission shall have all the powers that may be conferred upon a commissioner appointed under *The Act respecting Enquiries Concerning Public Matters*.

10. This agreement shall extend to, be binding upon and enure to the benefit of the successors and assigns of the parties hereto.

11. This agreement shall remain in force for thirty (30) years from the date of the first delivery of power hereunder.

In witness whereof the Commission and the Corporation have respectively affixed their corporate seals and the hands of their proper officers.

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.

(Sgd.) A. BECK, *Chairman*,

(Seal)

(Sgd.) W. W. POPE, *Secretary*.

MUNICIPAL CORPORATION OF THE TOWNSHIP OF ELDON.

(Sgd.) D. A. MCFADDEN, *Reeve*.

(Seal)

(Sgd.) R. C. MCKAY, *Clerk*.

SCHEDULE "F."

This Agreement made this 16th day of December, A.D. 1919.

Between

The Hydro-Electric Power Commission of Ontario, herein called the "Commission," party of the first part;

and

The Municipal Corporation of the Township of Scott, herein called the "Corporation," party of the second part.

Whereas, pursuant to an Act to provide for the transmission of electrical power to municipalities, the Corporation applied to the Commission for a supply of power;

And whereas the Corporation under the provisions of *The Power Commission Act* and amendments thereto and *The Power Commission Act of 1911*, being an Act to provide for the local distribution of electrical power, has, at the request of a number of ratepayers (petitioners) applied to the Commission for a supply of electrical power or energy, and has passed a by-law No. 55, December 15th, 1919, to authorize the execution of an agreement therefor.

1. Now therefore this indenture witnesseth that in consideration of the premises and of the agreements of the Corporation set forth, subject to the provisions of said Act and amendments, the Commission agrees with the Corporation:—

(a) To reserve and deliver at the earliest possible date electrical power to the Corporation as required by the Corporation.

(b) At the expiration of thirty (30) days' notice in writing which may be given by the Corporation from time to time during the continuance of this agreement, to reserve and deliver to the Corporation additional electrical power as may be required from time to time.

(c) To use at all times first class, modern, standard commercial apparatus and plant, and to exercise due skill and diligence so as to secure the most perfect operation of the plant and apparatus of the Corporation.

(d) Power shall be delivered to the Corporation at approximately 2,200 or 4,000 volts, or at any other primary voltage that may be available for the Corporation's use.

(e) To supply and construct all 2,200, 4,000 or other lines at primary voltage made necessary by contracts for electrical service made between the Corporation and residents or users, within the township, from the Commission's transformer station or stations to the service transformers of the Corporation, located at such points as the Commission may approve.

2. In consideration of the premises and of the covenants and agreements herein set forth, the Corporation agrees with the Commission:—

(a) To use all diligence by every lawful means in its power to prepare for the receipt and use of the power dealt with by this agreement, so as to be able to give notice as specified in paragraph 1 (b).

(b) Subject to the provisions of paragraph 2 (g) herein, to pay to the Commission monthly, for all power taken, including the charges in connection with the delivery of the power to the municipality as outlined in clauses 2 (c) and (d).

(c) To pay annually, in twelve monthly instalments, interest upon its proportionate part of the moneys expended by the Commission on capital account for the construction of lines, transformer stations and other necessary works for the delivery of power to the Corporation; to pay an annual sum for its proportionate part of the cost of the said construction, so as to form in thirty years a sinking fund for the retirement of the securities issued by the Province of Ontario; and to bear its proportionate part of the line loss and pay its proportionate part of the cost to operate, maintain, repair, renew and insure the said lines, stations and works. All payments under this paragraph shall be subject to adjustment under paragraph 7.

(d) In addition to the cost of power, and the cost of delivering it to the Corporation as provided for in paragraphs 2 (b) and (c), to pay to the Commission in half yearly instalments, interest and sinking fund on a thirty year basis on all capital invested by the Commission in 2,200, 4,000 or other lines of primary voltage as provided for in paragraph 1 (e), and to maintain, repair and operate the said lines, and set aside a fund for renewals at a rate to be fixed by the Commission, on all capital expended by the Commission on such construction.

(e) The amounts payable in accordance with clause 2 (b), (c) and (d) shall be paid in gold coin of the present standard of weight and fineness, at the office of the Commission at Toronto, and bills shall be rendered by the Commission on or before the 5th day and paid by the Corporation on or before the 15th day of each month except that payments under clause 2 (d) shall be made half yearly. If any bill remain unpaid for fifteen days, the Commission may, in addition to all other remedies and without notice, discontinue the supply of power to the Corporation until said bill is paid. No such discontinuance shall relieve the Corporation from the performance of the covenants, provisoies and conditions herein contained. All payments in arrears shall bear interest at the legal rate.

(f) To take power exclusively from the Commission during the continuance of this agreement.

(g) To pay for three-fourths of the power ordered from time to time by the Corporation and held in reserve for it as herein provided whether it takes the same or not. When the highest average amount of power taken for any twenty consecutive minutes during any month shall exceed during the twenty consecutive minutes three-fourths of the amount ordered by the Corporation and held in reserve, then the Corporation shall pay for this greater amount during the entire month.

If the Corporation during any month takes more than the amount of power ordered and held in reserve for it, as determined by an integrated peak, or highest average, for a period of twenty consecutive minutes, the Corporation shall pay for this greater amount of power during the entire

month. The taking of such excess shall thereafter constitute an obligation on the part of the Corporation to pay for and on the part of the Commission to hold in reserve an additional block of power in accordance with the terms and conditions of this contract.

When the power factor of the greatest amount of power taken for said twenty consecutive minutes falls below ninety per cent. (90%), the Corporation shall pay for ninety per cent. (90%) of the maximum kilovolt-amperes (considered as true power or kilowatts) when that amount is in excess of the maximum kilowatts taken. The maximum in kilowatts or kilovolt-amperes shall be taken as the maximum average or integrated demand over any twenty (20) consecutive minutes.

(h) To use at all times first-class, modern standard commercial apparatus and plant to be approved by the Commission and to exercise all due skill and diligence so as to secure the most perfect operation of the plant and apparatus of the Commission and of the Company.

(i) To co-operate, by all means in its power, at all times, with the Commission, to increase the quantity of power required from the Commission, and in all other respects to carry out the objects of this agreement and of the said Act.

3. The power shall be three-phase, alternating commercially continuous twenty-four hour power every day of the year except as provided in paragraph 5, having a periodicity of approximately 60 cycles per second, and shall be delivered as aforesaid at a voltage suitable for distribution within the municipality.

(a) That the meters with their series and potential transformers shall be connected at the point of delivery, and shall be subject to test as to accuracy by either party hereto.

(b) The maintenance by the Commission of approximately the agreed voltage at approximately the agreed frequency at the point of delivery to the Corporation shall constitute the supply of all power involved herein and the fulfilment of all operating obligations hereunder; and when voltage and frequency are so maintained, the amount of the power, its fluctuations, load factor, distribution as to phases, and all other electric characteristics and qualities are under the sole control of the Corporation, their agents, customers, apparatus, appliances and circuits.

4. The engineers of the Commission, or one or more of them, or any other person or persons appointed for this purpose by the Commission, shall have the right from time to time during the continuance of this agreement, to inspect the apparatus, plant and property of the Corporation and take records at all reasonable hours.

5. In case the Commission should at any time or times be prevented from supplying said power, or any part thereof, or in case the Corporation shall at any time be prevented from taking said power, or any part thereof, by strike, lockout, fire, invasion, explosion, act of God or the King's enemies, or any other cause reasonably beyond their control, then the Commission shall not be bound to deliver such power during such times, and the Corporation shall not be bound to pay the price of said power during such time.

6. The Commission shall at least annually adjust and apportion the amounts payable by municipal corporations for such power and such interest, sinking fund, line loss, and cost of operating, maintaining, repairing, renewing and insuring the line and works.

7. It is hereby declared that the Commission is to be a trustee of all property held by the Commission under this agreement for the Corporation and other municipal corporations supplied by the Commission, but the Commission shall be entitled to a lien upon said property for all moneys expended by the Commission under this agreement and not repaid. At the expiration of this agreement the Commission shall determine and adjust the rights of the Corporation and other municipal corporations, supplied by the Commission, having regard to the amounts paid by them respectively, under the terms of this agreement, and such other considerations, as may appear equitable to the Commission and are approved by the Lieutenant-Governor in Council.

8. If at any time any other municipal corporation, or pursuant to said Act, any railway or distributing company, or any other corporation or person, applies to the Commission for a supply of power, the Commission shall notify the applicant and the Corporation in writing, of a time and place and hear all representations that may be made as to the terms and conditions for such supply.

Without discrimination in favour of the applicants as to the price to be paid for equal quantities of power, the Commission may supply power upon such terms and conditions as may, having regard to the risk and expense incurred and paid, and to be paid by the Corporation, appear equitable to the Commission, and are approved by the Lieutenant-Governor in Council.

9. If differences arise between corporations to whom the Commission is supplying power, the Commission may upon application fix a time and place to hear all representations that may be made by the parties, and the Commission shall, in a summary manner when possible, adjust such differences and such adjustment shall be final.

The Commission shall have all the powers that may be conferred upon a commissioner appointed under *The Act respecting Enquiries Concerning Public Matters.*

10. This agreement shall extend to, be binding upon and enure to the benefit of the successors and assigns of the parties hereto.

11. This agreement shall remain in force for thirty (30) years from the date of the first delivery of power hereunder.

In witness whereof the Commission and the Corporation have respectively affixed their corporate seals and the hands of their proper officers.

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.

I. B. LUCAS, *Vice-Chairman.*

(SEAL)

W. W. POPE, *Secretary.*

MUNICIPAL CORPORATION OF THE TOWNSHIP OF SCOTT.

ALEXANDER NOBLE, *Reeve.*

(SEAL)

WM. B. WEBSTER, *Clerk.*

THE TOWNSHIP OF SCOTT.

BY-LAW No. 55.

A by-law authorizing the execution of an agreement with the Hydro-Electric Power Commission of Ontario to furnish to the township electric power.

Whereas a petition for power has been received from Mr. Jacob R. Meyers, lot number 23, concession three and others of this Township of Scott.

Therefore the reeve and clerk are hereby authorized to execute agreement between this Township of Scott and the Hydro-Electric Power Commission of the Province of Ontario for power for those and other petitioners who may apply for power.

Passed in open council this fifteenth day of December, A.D. 1919.

ALEXANDER NOBLE, *Reeve.*

(SEAL.)

WM. B. WEBSTER, *Clerk.*

SCHEDULE "G."

This indenture made in duplicate the tenth day of June, in the year of our Lord, nineteen hundred and nineteen.

Between

The Hydro-Electric Power Commission of Ontario, hereinafter called the "Commission," party of the first part,

and

The Board of Water Commissioners of the Municipal Corporation of the Town of Lindsay, hereinafter called the "Customer," party of the second part.

Whereas the Commission acting under *The Power Commission Act*, R.S.O., 1914, chapter 34, has available sufficient electrical power or energy for the purpose of this agreement;

And whereas the Customer has applied to the Commission for a supply of electrical power or energy;

And whereas the Customer is operating a pumping station in the Town of Lindsay, Province of Ontario, with head office at Lindsay, Ontario;

Now therefore this indenture witnesseth that in consideration of the premises and of the agreements of the parties hereto each agrees with the other as follows:—

1. The Commission agrees:

(a) To reserve for and deliver to the Customer one hundred (100) horsepower of electrical power or energy at the point of delivery, herein-after specified, beginning on the first day of June, 1918, and extending for the period of this agreement.

(b) To reserve for and deliver to the Customer additional horsepower in blocks of twenty-five (25) h.p. each, after the expiration of sixty days' notice in writing, up to a maximum of two hundred (200) h.p.

(c) To use at all times first class, modern standard commercial apparatus and plant and to exercise all due skill and diligence so that the service rendered to the Customer hereunder shall be satisfactory.

(d) To deliver commercially continuous twenty-four (24) hour power every day in the year, except as provided for herein, at the point of delivery, herein defined as the primary terminals of the Customer's transformers in Lindsay, Ontario.

2. The Customer agrees:

(a) To use all diligence by every lawful means in his power to prepare for the receipt and use of the power covered by this agreement, so as to be able to receive power on the date herein set forth.

(b) To pay to the Commission for all power used or held in reserve in monthly payments in gold coin at Lindsay under the following schedule or rate:—

Service charges:—

Ninety cents (90c.) per month per h.p. of maximum demand;
plus

Consumption charges of:—

Two and one-tenth cents (2.1c.) per kilowatt hour (E.W.H.) for all consumption up to the first 50 hours' monthly use of maximum demand;

One and four-tenth cents (1.4c.) per K.W.H. for the next 50 hours' monthly use of maximum demand;

and each month's service charge to be computed as though the maximum amount taken during that month had been taken for the whole month, save that paragraph (d) hereof shall govern the minimum and that this paragraph shall be subject to the stipulations of clauses 5 (b) and (d).

The amount of power taken or held in reserve under this agreement shall be taken as the maximum average amount of power taken for any ten consecutive minutes (the 10 minute integrated demand) as shown by meter.

From the gross bill, computed as above, will be allowed the following discount:—

A "prompt payment" discount of ten per cent. (10%) if the bill is paid by the date set forth hereunder.

(c) To take power exclusively from the Commission of the terms of this agreement, and not to sell or dispose of said power, or any part thereof, directly or indirectly, without the written consent of the Commission.

(d) If the customer during any month takes more than the amount of power ordered and held in reserve for him for ten (10) consecutive minutes the taking of such excess power shall thereafter constitute an obligation on the part of the Customer to pay service charge for, and on the part of the Commission to hold in reserve such increased quantity of power in accord-

ance with the terms and conditions of this agreement, as long as this greater amount does not exceed the maximum hereunder, provided that all power used in excess of the amount held in reserve if used for fire purposes shall be paid for during the month in which it is used but shall not be considered as establishing a new maximum demand to govern future minimum payments.

(e) At all times to take and use the three-phase power in such a manner that the current will be taken equally from the three phases and in no case shall the difference between any two phases be greater than ten per cent. (10%).

(f) At all times so to take and use the three-phase power that the ratio of the kilowatts to the kilovolt-amperes is a maximum, but in any event the Customer shall pay for at least ninety per cent. (90%) of the maximum kilovolt-amperes considered as true power or kilowatts. The maximum demand in kilovolt-amperes or kilowatts shall be taken as the maximum average or integrated demand over any ten consecutive minutes.

One horsepower is defined as 0.746 kilowatts.

One kilowatt is defined as the product of the instantaneous current, voltage and power factor of the load as shown by a standard polyphase wattmeter and divided by 1,000.

One kilovolt-ampere is defined as the product of the simultaneous average current per phase times the average voltage between phases, times 1,732 and divided by 1,000.

For the purpose of this agreement, the kilovolt-amperes may be determined either directly by current and voltage measurements or by the power factor as may be approved by the Commission.

The power factor is defined as the kilowatts divided by kilovolt-amperes.

(g) Bills shall be rendered by the Commission to the Customer on or before the fifth day, and paid by the Customer on or before the fifteenth day of each calendar month.

If any bill remains unpaid for thirty (30) days after the date thereof the Commission may, in addition to all other remedies, and without notice, discontinue the supply of power to the Customer until the said bill is paid and no such discontinuance by the Commission shall relieve the Customer from the performance of the covenants, provisoies and conditions herein contained.

All payments in arrears shall bear interest at the legal rate.

(h) To use at all times modern, standard commercial apparatus and plant to be approved by the Commission from time to time and so to operate and conduct the plant and apparatus as to cause minimum disturbance or fluctuations to the Commission's supply and to exercise all due skill and diligence so as to secure the satisfactory operation of the plant and apparatus of both the Commission and the Customer.

(i) Should it be expedient or necessary for the Commission in order to deliver power hereunder, to construct, install or build poles, lines, cables, transformers, switches or other appliances or devices on, over or through the property of the Customer, or on, over or through any other adjoining property, the Customer hereby agrees to supply and arrange for such necessary rights-of-way, free of costs and satisfactory to the Commission for the life of this agreement or renewals thereof, and for thirty (30) days thereafter, so that the Commission may build, erect, construct, operate, repair, maintain and remove any of said apparatus or devices belonging to the Commission.

(j) The Customer shall erect a substation approved by the Commission and shall supply, install and operate the electrical equipment therein as instructed by the Commission.

3. The power delivered hereunder shall be alternating three phase having a periodicity of approximately four thousand volts between phase wires, subject to normal variations in both frequency and voltage not to exceed five per cent. (5%).

4.—(a) Measurement of the power held in reserve or taken by the Customer hereunder shall be made by means of a standard polyphase integrated demand watthour meter, and other meters as required, so arranged as to accurately measure and record the power taken by the customer.

(b) The point of measuring the power covered by this agreement shall be as near as possible to the point of delivery, and the instruments, with the necessary current and potential transformers for the measurement of power hereunder shall be provided, installed and maintained correct by the Commission.

Records from said meters shall be on file with the Commission and shall be available to the Customer for inspection at all reasonable times.

(c) Whenever the said measuring instruments are connected at other than the point of delivery their reading shall be subject to a correction and shall be corrected to give a reading such as would be obtained by instruments connected at the point of delivery. Such correction shall be based upon tests or calculations by the Commission.

(d) Should the point of measurement be located on the premises of the Customer no rental charge shall be made to the Commission for the location of said instruments, transformers or other equipment on the Customer's premises.

(e) Access to said instruments and transformers belonging to the Commission shall be free to the Commission at any and all times and the Commission may test, calibrate or remove said measuring instruments and transformers at any reasonable time, but when possible the customer shall be advised at least seven days in advance of the Commission's intention to re-calibrate, remove or change the measuring instruments.

(f) The Customer shall have the right to test any such measuring instrument in the presence of a representative of the Commission by giving to the Commission seven days' previous notice in writing of its desire to test such measuring instruments.

(g) The Commission shall repair or replace and re-test defective meters or measuring equipment within a reasonable time, but during the time there is no meter in service, it shall be assumed that the power consumed is the same as for other days of the same month on which a similar load existed.

(h) The Customer shall be responsible for any damage to the property or apparatus furnished by the Commission for the purpose of supplying or measuring power hereunder and installed on the Customer's property, providing such damage originates from a source external to the said apparatus of the Commission, and is not due to defect in the apparatus of the Commission.

5 (a) The maintenance by the Commission of approximately the agreed voltage at approximately the agreed frequency at the point of delivery shall constitute the supply of power involved herein and a fulfilment of all the operating obligations hereunder, and when the voltage and the frequency are so maintained the amount of power, its fluctuations, load factor, power factor, distribution as to phases, and all other characteristics and qualities are under the sole control of the Customer, his agents, apparatus, appliances and circuits.

(b) In case the Commission shall at any time or times be prevented from delivering said power or any part thereof by strikes, lockouts, riot, fire, invasion, explosion, act of God, the King's enemies, or any other cause or causes reasonably beyond its control, then the Commission shall not be bound to deliver such power during such time and the Customer shall not be bound to pay for such power during such time.

(c) The Commission shall be prompt and diligent in removing the cause of such interruption, and as soon as the cause of such interruption is removed the Commission shall, without delay, deliver the said power as aforesaid, and the Customer shall take and use the same.

(d) It is further agreed hereby that the Commission shall have the right at reasonable times, and when possible after due notice has been given to the Customer to discontinue the supply of power to the Customer for the purpose of safeguarding life or property, or for the purpose of making repairs, renewals or replacements to the lines or apparatus of the Commission, but all such interruptions shall be of a minimum duration and when possible arranged for a time least objectionable to the Customer.

Such interruptions shall not release the Customer from his obligations to pay for or resume the use of power when service is restored.

6. A representative or engineer of the Commission appointed for this purpose, may, at any reasonable time during the continuance of this agreement, have access to the premises of the Customer for the purpose of inspecting the electrical apparatus, plant or property of the Customer and to take records therefrom as required.

7. It is mutually agreed:—

That in case of any dispute arising between the parties hereto relative to the fulfilment of any of the terms, provisoies or conditions of this agreement, or as to the method or accuracy of the measurement of power, or any

other question which may arise under this agreement, the same shall be promptly referred to arbitration under *The Arbitration Act*, and the finding of said arbitration or arbitrators shall be final and binding upon both parties hereto.

8. This agreement shall be binding upon both parties hereto for a period of five (5) years, beginning on the day and date when power is first taken hereunder, and this agreement will be considered as being automatically renewed from year to year thereafter, unless notice of cancellation is given by either party hereto to the other one month before the expiration of the first period or any succeeding yearly period.

9. The Commission shall be entitled at the termination of this agreement, or any extension thereof, or within thirty (30) days thereafter, to remove from the Customer's premises any and all plant or equipment which may have been installed by the Commission for the supply or measurement of power hereunder.

10. This agreement shall extend to, and be binding upon and enure to the benefit of the successors and assigns of the parties hereto respectively.

In witness whereof the parties hereto have affixed their seals and the hands of their proper officers.

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.

A. BECK.

W. W. POPE, *Secretary.*

Witnesses:

.....

THE BOARD OF WATER COMMISSIONERS OF THE
MUNICIPAL CORPORATION OF THE TOWN OF
LINDSAY.

T. J. BRADY.

D. RAY.

(Seal.)

O. W. YOUNG.

Approved:

.....
District Manager.

SCHEDULE "H."

This Indenture made in duplicate the 10th day of February, in the year of our Lord, one thousand nine hundred and twenty (1920).

Between

The Hydro-Electric Power Commission of Ontario, hereinafter called the "Commission," party of the first part,

and

The Municipal Corporation of the Village of Lancaster, hereinafter called the "Corporation," party of the second part.

Whereas the Corporation, under the provisions of *The Power Commission Act* and amendments thereto, Revised Statutes of Ontario, Chapter 39, has applied to the Commission for a supply of power and has passed a by-law No. 389, passed the 3rd day of December, 1919, to authorize the execution of an agreement therefor;

And whereas in accordance with the powers conferred by Legislature upon the Commission by the said Act and amendments thereto, the Commission intends to purchase, acquire or construct generating stations, hydraulic plants, lines, sub-stations, and all works in connection therewith required for the purposes of supplying power hereunder, or to enter into an agreement with one or more power generating companies or individuals for a supply of power required hereunder, and to construct the necessary stations, plant, lines and equipment to transmit, transform and deliver power to the Corporation;

Now therefore this Indenture witnesseth that in consideration of the premises and of the agreement of the Corporation herein set forth, subject to the provisions of the said Act and amendments thereto, the parties hereto agree each with the other as follows:

1. The Commission agrees:

(a) To reserve and deliver at the earliest possible date fifty (50) horse power, or more, of electrical power to the Corporation.

(b) At the expiration of reasonable notice, in writing, which may be given by the Corporation from time to time during the continuance of this agreement, to reserve and deliver to the Corporation additional electric power when called for.

(c) To use at all times first-class, modern, standard commercial apparatus and plant, and to exercise all due skill and diligence so as to secure the satisfactory operation of the plant and apparatus of the Corporation.

(d) To deliver commercially continuous twenty-four (24) hour power every day in the year to the Corporation at the distribution bus bars in the Commission's sub-station within the Corporation's limits.

2. The Corporation agrees:

(a) To use all diligence by every lawful means in its power to prepare for the receipt and use of the power dealt with by this agreement so as to be able to receive power when the Commission is ready to deliver same.

(b) To pay annually in twelve (12) equal monthly instalments, interest upon its proportionate part (based on the quantity of electrical energy or power taken) of all moneys expended by the Commission on capital account for the acquiring of properties and rights, the acquiring and construction of generating plants, transformer stations, transmission lines, distributing stations, and other works necessary for the delivery of said electrical energy or power to the Corporation under the terms of this contract.

To pay an annual sum for its proportionate part of all moneys expended by the Commission on capital account for the said properties and rights, purchasing of power and the cost of the said construction, so as to form in thirty (30) years a sinking fund for the retirement of securities issued by the Province of Ontario.

Also to bear its proportionate part of the line loss and pay its proportionate part of the cost to operate, maintain, repair, renew and insure the said generating plants, transformer stations, transmission lines, distributing stations, and other necessary works.

All payments under this clause shall be subject to adjustment under paragraph 6.

(c) The amounts payable in accordance with clause 2 (b) shall be paid in gold coin of the present standard of weight and fineness, at the offices of the Commission at Toronto. Bills shall be rendered by the Commission on or before the 5th day and paid by the Corporation on or before the 15th day of each month. If any bills remain unpaid for fifteen days, the Commission may, in addition to all other remedies and without notice, discontinue the supply of power to the Corporation until said bill is paid. No such discontinuance shall relieve the Corporation from the performance of the covenants, provisoies and conditions herein contained. All payments in arrears shall bear interest at the legal rate.

(d) To take power exclusively from the Commission during the continuance of this agreement.

(e) To pay for three-fourths of the power ordered from time to time by the Corporation and held in reserve for it as herein provided, whether it takes the same or not. When the highest average amount of power taken for any twenty consecutive minutes during any month exceeds during the twenty consecutive minutes three-fourths of the amount ordered by the Corporation and held in reserve, then the Corporation shall pay for this greater amount during the entire month.

If the Corporation during any month takes more than the amount of power ordered and held in reserve for it, as determined by an integrated peak, or the highest average, for a period of twenty consecutive minutes, the taking of such excess shall thereafter constitute an obligation on the part of the Corporation to pay for, and on the part of the Commission to hold in reserve, such increased quantity of power in accordance with the terms and conditions of this contract.

(f) To take and use the three-phase power at all times in such manner that the power factor, i.e., the ratio of the kilowatts to the kilovolt-amperes is a maximum, but, in any event the corporation shall pay for 90 per cent. of the maximum kilovolt-amperes considered as true power factor or
6 H.E.

kilowatts. The maximum in kilo-volt-amperes or kilowatts shall be taken as the maximum average or integrated demand over any twenty consecutive minutes.

(g) To use at all times first-class, modern, standard commercial apparatus and plant, to be approved by the Commission and to exercise all due skill and diligence so as to secure satisfactory operation of the plant and apparatus of the Commission and of the Corporation.

(h) To co-operate by all means in its power at all times with the Commission to increase the quantity of power required from the Commission, and in all other respects to carry out the objects of this agreement, and of the said Act.

3. This agreement shall remain in force for thirty (30) years from the date of the first delivery of power under this contract.

4. The power shall be alternating, three-phase, having a periodicity of approximately 60 cycles per second, and shall be delivered as aforesaid at a voltage suitable for local distribution.

5. The engineers of the Commission, or one or more of them, or any other person or persons appointed for this purpose by the Commission, shall have the right from time to time, during the continuance of this agreement, to inspect the apparatus, plant, and property of the Corporation, and take records at all reasonable hours.

6. The Commission shall at least annually adjust and apportion the amount or amounts payable by the Municipal Corporation or Corporations for such power and such interest, sinking fund, cost of lost power and cost of generating, operating, maintaining, repairing, renewing and insuring said works.

7. It is hereby declared that the Commission is to be a trustee of all property held by the Commission under this agreement for the Corporation and other municipal corporations supplied by the Commission, but the Commission shall be entitled to a lien upon said property for all moneys expended by the Commission under this agreement and not repaid. At the expiration of this agreement the Commission shall determine and adjust the rights of the Corporation and other municipal corporations, supplied by the Commission, having regard to the amounts paid by them, respectively, under the terms of this agreement, and such other considerations as may appear equitable to the Commission and are approved by the Lieutenant-Governor in Council.

8. If at any time any other municipal corporation, or pursuant to said Act, any railway or distributing company, or any other corporation or person, applies to the Commission for a supply of power, the Commission shall notify the applicant and the Corporation, in writing, of a time and place to hear all representations that may be made as to the terms and conditions for such supply.

Without discrimination in favour of the applicants as to the price to be paid, for equal quantities of power, the Commission may supply power upon such terms and conditions as may, having regard to the risk and expense incurred, and paid, and to be paid by the Corporation, appear equitable to the Commission, and are approved by the Lieutenant-Governor in Council.

No such application shall be granted if the said works, or any part thereof, are not adequate for such supply, or if the supply of the Corporation will be thereby injuriously affected, and no power shall be supplied within the limits of a municipal corporation taking power from the Commission at the time of such application; without the written consent of such Corporation.

In determining the quantity of power supplied to a municipal corporation the quantity supplied by the Commission within the limits of the Corporation to any applicant, other than a municipal corporation, shall be computed as part of the quantity supplied to such Corporation, but such Corporation shall not be liable for payment for any portion of the power so supplied. No power shall be supplied by the municipal corporation to any railway or distributing company, without the written consent of the Commission, but the Corporation may sell power to any person or persons, or manufacturing companies within the limits of the Corporation, but such power shall not be sold for less than cost, neither shall there be any discrimination as regards price and quantity.

9. If differences arise between corporations to which the Commission is supplying power, the Commission may, upon application, fix a time and place and hear all representations that may be made by the parties, and the Commission shall, in a summary manner, when possible, adjust such differences, and such adjustment shall be final. The Commission shall have all the powers that may be conferred upon a commissioner appointed under *The Act respecting Enquiries concerning Public Matters*.

10. This agreement shall extend to, be binding upon, and enure to the benefit of the successors and assigns of the parties hereto.

In witness whereof the Commission and the Corporation have respectively affixed their corporate seals and the hands of their proper officers.

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.

(Sgd.) I. B. LUCAS, *Vice-Chairman.*

(Seal.)

(Sgd.) W. W. POPE, *Secretary.*

THE MUNICIPAL CORPORATION OF THE VILLAGE OF LANCASTER.

(Sgd.) R. T. NICHOLSON, *Reeve.*

(Seal.)

(Sgd.) E. I. SLUNNETT, *Clerk.*

SCHEDULE "I."

Municipality.	Quantity of power applied for in H.P.
Lakefield	200
Havelock	200
Norwood	200

(Copy of Lakefield agreement follows here.)

This Indenture, made in duplicate the 14th day of February, in the year of our Lord, one thousand nine hundred and twenty.

Between

The Hydro-Electric Power Commission of Ontario, hereinafter called the "Commission," party of the first part,

and

The Municipal Corporation of the Village of Lakefield, hereinafter called the "Corporation," party of the second part.

Whereas the Corporation, under the provisions of *The Power Commission Act* and amendments thereto, Revised Statutes of Ontario, Chapter 39, has applied to the Commission for a supply of power and has passed a By-law No. 565, passed the 8th day of December, 1919, to authorize the execution of an agreement therefor.

Now therefore this indenture witnesseth, that in consideration of the premises and of the agreements of the Corporation herein set forth, subject to the provisions of the said Act and amendments thereto, the parties hereto agree each with the other as follows:

1. The Commission agrees:

(a) To reserve and deliver at the earliest possible date, two hundred (200) horse power, or more of electrical power to the Corporation.

(b) At the expiration of reasonable notice, in writing, which may be given by the Corporation from time to time during the continuance of this agreement, to reserve and deliver to the Corporation additional electric power when called for.

(c) To use at all times first-class, modern, standard commercial apparatus and plant, and to exercise all due skill and diligence so as to secure satisfactory operation of the plant and apparatus of the Corporation.

(d) To deliver commercially continuous twenty-four (24) hour power every day in the year to the Corporation at the distribution bus bars in the Commission's substation within the Corporation's limits.

2. The Corporation agrees:

(a) To use all diligence by every lawful means in its power to prepare for the receipt and use of the power dealt with by this agreement so as to be able to receive power when the Commission is ready to deliver same.

(b) To pay annually in twelve (12) equal monthly instalments, interest upon its proportionate part (based on the quantity of electrical energy or power taken) of all moneys expended by the Commission on capital account for the acquiring of properties and rights, the acquiring and construction of generating plants, transformer stations, transmission lines, distributing stations, and other works necessary for the delivery of said electrical energy or power to the Corporation under the terms of this contract.

To pay an annual sum for its proportionate part of all moneys expended by the Commission on capital account for the acquiring of the said properties and rights, and the cost of the said construction, so as to form in thirty (30) years a sinking fund for the retirement of securities issued by the Province of Ontario.

Also to bear its proportionate part of the line loss and pay its proportionate part of the cost to operate, maintain, repair, renew and insure the said generating plants, transformer stations, transmission lines, distributing stations, and other necessary works.

All payments under this clause shall be subject to adjustment under paragraph six.

(c) The amounts payable in accordance with clause 2 (b) shall be paid in gold coin of the present standard of weight and fineness, at the offices of the Commission at Toronto. Bills shall be rendered by the Commission on or before the 5th day and paid by the Corporation on or before the 15th day of each month. If any bills remain unpaid for fifteen days the Commission may, in addition to all other remedies and without notice, discontinue the supply of power to the Corporation until said bill is paid. No such discontinuance shall relieve the Corporation from the performance of the covenants, provisoies and conditions herein contained. All payments in arrear shall bear interest at the legal rate.

(d) To take electric power exclusively from the Commission during the continuance of this agreement.

(e) To pay for three-fourths of the power ordered from time to time by the Corporation and held in reserve for it as herein provided, whether it takes the same or not. When the highest average amount of power taken for any twenty consecutive minutes during any month exceeds the twenty consecutive minutes three-fourths of the amount ordered by the Corporation and held in reserve, then the Corporation shall pay for this greater amount during the entire month.

If the Corporation during any month takes more than the amount of power ordered and held in reserve for it, as determined by an integrated peak, or the highest average, for a period of twenty consecutive minutes, the taking of such excess shall thereafter constitute an obligation on the part of the Corporation to pay for, and on the part of the Commission to hold in reserve, such increased quantity of power in accordance with the terms and conditions of this contract.

When the power factor of the highest average amount of power taken for said twenty consecutive minutes falls below 90 per cent., the corporation shall pay for 90 per cent. of the kilovolt amperes provided that said ninety per cent. (90%) of said kilovolt amperes is greater than the maximum kilowatts for any twenty (20) minute period during the month.

(f) To use at all times first-class, modern, standard commercial apparatus and plant, to be approved by the Commission, and to exercise all due skill and diligence so as to secure satisfactory operation of the plant and apparatus of the Commission and of the Corporation.

(g) To co-operate by all means in its power at all times with the Commission to increase the quantity of power required from the Commission, and in all other respects to carry out the objects of this agreement, and of the said Act.

3. This agreement shall remain in force for thirty (30) years from the date of the first delivery of power under this contract.

4. The power shall be alternating, three phase having a periodicity of approximately 60 cycles per second, and shall be delivered as aforesaid at a voltage suitable for local distribution.

5. The engineers of the Commission, or one or more of them, or any other person or persons appointed for this purpose by the Commission, shall have the right from time to time, during the continuance of this agreement, to inspect the apparatus, plant and property of the Corporation, and take records at all reasonable hours.

6. The Commission shall at least annually adjust and apportion the amount or amounts payable by the municipal corporation or corporations for such power and such interest, sinking fund, cost of lost power and cost of generating, operating, maintaining, repairing, renewing and insuring said works.

7. It is hereby declared that the Commission is to be a trustee of all property held by the Commission under this agreement for the corporations and other municipal corporations supplied by the Commission, but the Commission shall be entitled to a lien upon said property for all moneys expended by the Commission under this agreement and not repaid. At the expiration of this agreement the Commission shall determine and adjust the rights of the corporations and other municipal corporations supplied by the Commission, having regard to the amounts paid by them, respectively, under the terms of this agreement, and such other considerations as may appear equitable to the Commission and are approved by the Lieutenant-Governor in Council.

8. If at any time any other municipal corporation, or pursuant to said Act, any railway or distributing company, or any other corporation or person, applies to the Commission for a supply of power, the Commission shall notify the applicant and the corporation, in writing, of a time and place to hear all representations that may be made as to the terms and conditions for such supply.

Without discrimination in favour of the applicants as to the price to be paid, for equal quantity of power, the Commission may supply power upon such terms and conditions as may, having regard to the risk and expense incurred and paid, and to be paid by the Corporation, appear equitable to the Commission, and are approved by the Lieutenant-Governor in Council.

No such application shall be granted if the said works, or any part thereof, are not adequate for such supply, or if the supply of the Corporation

will be thereby injuriously affected, and no power shall be supplied within the limits of a municipal corporation taking power from the Commission at the time of such application, without the written consent of such Corporation.

In determining the quantity of power supplied to a municipal corporation, the quantity supplied by the Commission within the limits of the Corporation to any applicant, other than a municipal corporation, shall be computed as part of the quantity supplied to such corporation, but such corporation shall not be liable for payment for any portion of the power so supplied. No power shall be supplied by the municipal corporation to any railway or distributing company, without the written consent of the Commission, but the corporation may sell power to any person or persons, or manufacturing companies within the limits of the corporation, but such power shall not be sold for less than cost; neither shall there be any discrimination as regards price and quantity.

9. If differences arise between corporations to which the Commission is supplying power, the Commission may, upon application, fix a time and place to hear all representations that may be made by the parties, and the Commission shall, in a summary manner, when possible, adjust such differences and such adjustment shall be final. The Commission shall have all the powers that may be conferred upon a commissioner appointed under *The Act respecting Enquiries concerning Public Matters*.

10. This agreement shall extend to, be binding upon, and enure to the benefit of the successors and assigns of the parties hereto.

In witness whereof the Commission and the Corporation have respectively affixed their corporate seals and the hands of their proper officers.

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.

(Sgd.) I. B. LUCAS, *Vice-Chairman.*

(Seal.)

(Sgd.) W. W. POPE, *Secretary.*

MUNICIPAL CORPORATION OF THE VILLAGE OF LAKEFIELD.

(Sgd.) J. C. STRICKLAND, *Reeve.*

(Seal.)

(Sgd.) W. SHERIN, *Clerk.*

SCHEDULE "J."

Municipality.	Quantity of Power Applied for in H.P.
Uxbridge	125
Kirkfield	30
Port Perry	125

(Here follows copy of Uxbridge agreement.)

This Indenture made in duplicate the 3rd day of March, in the year of our Lord one thousand nine hundred and twenty.

Between

The Hydro-Electric Power Commission of Ontario, hereinafter called the "Commission," party of the first part,

and

The Town of Uxbridge, located in Ontario County, Ontario, hereinafter called the "Corporation," party of the second part.

Whereas, pursuant to an Act to provide for the transmission of electrical power to municipalities, known as *The Power Commission Act* and amendments thereto, the Corporation applied to the Commission for a supply of power, and the Commission furnished the Corporation with estimates of the total cost of such power, ready for distribution within the limits of the Corporation (and the electors of the Corporation consented to the By-law No. 721, authorizing the Corporation to enter into a contract with the Commission for such power).

1. Now therefore this indenture witnesseth, that in consideration of the premises and of the agreement of the Corporation herein set forth, subject to the provisions of the said Act and amendments thereto, the Commission agree with the Corporation:

(a) To reserve and deliver at the earliest possible date one hundred and twenty-five horse power (125 h.p.) or more of electrical power to the Corporation.

(b) At the expiration of reasonable notice in writing, which may be given by the Corporation from time to time during the continuance of this agreement, to reserve and deliver to the Corporation additional electric power when called for.

(c) To use at all times first-class, modern, standard, commercial apparatus and plant, and to exercise all due skill and diligence so as to secure satisfactory operation of the plant and apparatus of the Corporation.

(d) To deliver commercially continuous twenty-four (24) hour power every day in the year to the Corporation at the distribution bus bars in the Commission's sub-station within the Corporation's limits.

2. In consideration of the premises and of the agreements herein set forth, the Corporation agrees with the Commission.

(a) To use all diligence by every lawful means in its power to prepare for the receipt and use of the power dealt with by this agreement so as to be able to receive power when the Commission is ready to deliver same.

(b) To pay annually, interest at rate payable by the Commission upon the Corporation's proportionate part (based on the quantity of electrical energy or power taken), of all moneys expended by the Commission on capital account for the acquiring of properties and rights, the acquiring and construction of generating plants, transformer stations, transmission lines, distributing stations and other works necessary for the delivery of said electrical energy or power to the Corporation under the terms of this contract.

Also to pay an annual sinking fund instalment of such amount as to form at the end of thirty (30) years, with accrued interest, a sinking fund sufficient to repay the Corporation's proportionate part, based as aforesaid, of all moneys advanced by the Province of Ontario for the acquiring of properties and rights, the acquiring and construction of generating plants, transformer stations, transmission lines, distributing stations and other work necessary for the delivery of said electrical energy or power, delivered to the Corporation under the terms of this contract. Also to pay the Corporation's proportionate part, based as aforesaid, of the cost of lost power and of the cost of operating, maintaining, repairing, renewing and insuring said generating plants, transformer stations, transmission lines, distributing stations and other necessary works; subject to adjustment under clause 6 of this agreement.

(c) The amounts payable under this contract shall be paid in twelve monthly payments, in gold coin of the present standard of weight and fineness, at the offices of the Commission at Toronto. Bills shall be rendered by the Commission on or before the fifth day and paid by the Corporation on or before the fifteenth day of each month. If any bill remains unpaid for fifteen days the Commission may, in addition to all other remedies and without notice, discontinue the supply of power to the Corporation until said bill is paid. No such discontinuance shall relieve the Corporation from the performance of the covenants, provisoies and conditions herein contained. All payments in arrears shall bear interest at the legal rate.

(d) To take electrical power exclusively from the Commission during the continuance of this agreement.

(e) To co-operate by all means in its power at all times with the Commission to increase the quantity of power required from the Commission and in all other respects to carry out the object of this agreement and of the said Act.

(f) To pay for three-fourths of the power ordered from time to time by the Corporation and held in reserve for it as herein provided, whether it takes the same or not. When the highest average amount of power taken for any twenty (20) consecutive minutes during any month shall exceed during the twenty (20) consecutive minutes three-fourths of the amount ordered by the Corporation and held in reserve, then the Corporation shall pay for this greater amount during the entire month.

(g) If the Corporation during any month takes more than the amount of power ordered and held in reserve for it, as determined by an integrated

peak, or highest average, for a period of twenty (20) consecutive minutes the taking of such excess shall thereafter constitute an obligation on the part of the Corporation to pay for, and on the part of the Commission to hold in reserve such increased quantity of power in accordance with the terms and conditions of this contract.

(h) When the power factor of the highest average amount of power taken for said twenty (20) consecutive minutes falls below ninety per cent. (90%) the Corporation shall pay for ninety per cent. (90%) of said kilovolt-amperes, providing that said ninety (90%) of said kilovolt-amperes is greater than the maximum kilowatts for any twenty (20) minute period during the month.

(i) To use at all times first-class, modern, standard, commercial apparatus and plant, to be approved by the Commission.

(j) To exercise all due skill and diligence so as to secure satisfactory operation of the plant and apparatus of the Commission and of the Corporation.

3. This agreement shall remain in force for thirty (30) years from date of the first delivery of power under this contract.

4. The power shall be alternating, three-phase, having a periodicity of approximately sixty (60) cycles per second and shall be delivered at a voltage suitable for local distribution.

(a) The meters with their series and potential transformers shall be connected at the point of delivery.

(b) The maintenance by the Commission of approximately the agreed voltage at approximately the agreed frequency at the substation in the limits of the Corporation shall constitute the supply of all power involved herein and the fulfilment of all operating obligations hereunder, and when voltage and frequency are so maintained, the amount of power, its fluctuations, load factor, power factor, distribution as to phases and all other electric characteristics and qualities are under the sole control of the Corporation, their agents, customers, apparatus, appliances and circuits.

5. The engineers of the Commission, or one or more of them, or any other person or persons appointed for this purpose by the Commission, shall have the right from time to time during the continuance of this agreement to inspect the apparatus, plant and property of the Corporation and take records at all reasonable hours.

6. The Commission shall, at least annually adjust and apportion the amount or amounts payable by the municipal corporation or corporations for such power and such interest, sinking fund, cost of lost power, and cost of generating, operating, maintaining, repairing, renewing and insuring said works.

If at any time any other municipal corporation, or pursuant to said Act; any railway or distributing company, or any other corporation or person, applies to the Commission for a supply of power, the Commission shall notify the applicant and the involved corporation or corporations in writing, of a time and place to hear all representations that may be made as to the terms and conditions for such supply.

Without discrimination in favour of the applicants as to the price to be paid, for equal quantities of power, the Commission may supply power upon such terms and conditions, as may, having regard to the risk and expense incurred, and paid, and to be paid by the Corporation, appear equitable to the Commission and are approved by the Lieutenant-Governor in Council.

No such application shall be granted if the said works or any part thereof are not adequate for such supply, or if the supply of the Corporation will be thereby injuriously affected, and no power shall be supplied within the limits of a municipal corporation taking power from the Commission at the time such application is made, without the written consent of such Corporation.

In determining the quantity of power supplied to a municipal corporation, the quantity supplied by the Commission within the limits of the Corporation to any applicant, other than a municipal corporation, shall be computed as part of the quantity supplied to such corporation, but such corporation shall not be liable for payment for any portion of the power so supplied. No power shall be supplied by the municipal corporation to any railway or distributing company without the written consent of the Commission. Power shall not be sold for less than the cost and there shall be no discrimination as regards price and quantity.

7. It is hereby declared that the Commission is to be a trustee of all property held by the Commission under this agreement for the corporation or corporations supplied by the Commission, but the Commission shall be entitled to a lien upon said property for all moneys expended by the Commission under this agreement and not repaid. At the expiration of this agreement the Commission shall determine and adjust the rights of the Corporation and any other (if any) supplied by the Commission, having regard to the amounts paid by them respectively under the terms of this agreement, and such other considerations as may appear equitable to the Commission and are approved by the Lieutenant-Governor in Council.

8. If differences arise between corporations to which the Commission is supplying power, the Commission may upon application fix a time and place and hear all representations that may be made by the parties, and the Commission shall in a summary manner, when possible, adjust such differences and such adjustment shall be final. The Commission shall have all the powers that may be conferred upon a Commissioner appointed under *The Act respecting Enquiries concerning Public Matters*.

9. This agreement shall extend to, be binding upon, and enure to the benefit of the successors and assigns of the parties hereto.

In witness whereof the Commission and the Corporation have respectively affixed their corporate seals and the hands of their proper officers.

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.

(Sgd.) A. BECK, *Chairman.*

(Seal).

(Sgd.) W. W. POPE, *Secretary.*

THE TOWN OF UXBRIDGE.

(Sgd.) J. W. GOULD, *Mayor.*

(Seal).

(Sgd.) W. H. CROSBY, *Clerk.*

SCHEDULE "K."

Municipality.	Quantity of Power Applied for in H.P.
Wingham	400
Kincardine	350
Lucknow	100
Teeswater	150
Priceville	25
Ripley	100

(Here follows copy of Wingham agreement.)

This Indenture made in duplicate the 20th day of February, in the year of our Lord, 1920,

Between

The Hydro-Electric Power Commission of Ontario, hereinafter called the "Commission," party of the first part,

and

The Town of Wingham, located in Huron County, Ontario, hereinafter called the "Corporation," party of the second part.

Whereas, pursuant to an Act to provide for the transmission of electrical power to municipalities, known as *The Power Commission Act* and amendments thereto, the Corporation applied to the Commission for a supply of power, and the Commission furnished the Corporation with estimates of the total cost of such power, ready for distribution within the limits of the Corporation (and the electors of the Corporation consented to the By-law Number 817, authorizing the Corporation to enter into a contract with the Commission for such power).

1. Now therefore this indenture witnesseth, that in consideration of the premises and of the agreement of the Corporation herein set forth, subject to the provisions of the said Act and amendments thereto, the Commission agrees with the Corporation:

(a) To reserve and deliver at the earliest possible date four hundred horse power (400 h.p.) or more of electrical power to the Corporation.

(b) At the expiration of reasonable notice in writing, which may be given by the Corporation from time to time during the continuance of this agreement, to reserve and deliver to the Corporation additional electrical power when called for.

(c) To use at all times first-class, modern, standard, commercial apparatus and plant, and to exercise all due skill and diligence so as to secure satisfactory operation of the plant and apparatus of the Corporation.

(d) To deliver commercially continuously 24-hour power every day in the year to the Corporation at the distribution bus bars in the Commission's sub-station within the Corporation's limits.

2. In consideration of the premises and of the agreements herein set forth, the Corporation agrees with the Commission.

(a) To use all diligence by every lawful means in its power to prepare for the receipt and use of the power dealt with by this agreement so as to be able to receive power when the Commission is ready to deliver same.

(b) To pay annually, interest at rate payable by the Commission upon the Corporation's proportionate part (based on the quantity of electrical energy or power taken), of all moneys expended by the Commission on capital account for the acquiring of properties and rights, the acquiring and construction of generating plants, transformer stations, transmission lines, distributing stations and other works necessary for the delivery of said electrical energy or power to the Corporation under the terms of this contract.

Also to pay an annual sinking fund instalment of such amount as to form at the end of thirty years with accrued interest, a sinking fund sufficient to repay the Corporation's proportionate part, based as aforesaid, of all moneys advanced by the Province of Ontario for the acquiring of properties and rights, the acquiring and construction of generating plants, transformer stations, transmission lines, distributing stations and other work necessary for the delivery of said electrical energy or power, delivered to the Corporation under the terms of this contract. Also to pay the Corporation's proportionate part, based as aforesaid, of the cost of lost power and of the cost of operating, maintaining, repairing, renewing and insuring said generating plants, transformer stations, transmission lines, distributing stations and other necessary works; subject to adjustment under clause 6 of this agreement.

(c) The amounts payable under this contract shall be paid in twelve monthly payments, in gold coin of the present standard of weight and fineness, at the offices of the Commission at Toronto. Bills shall be rendered by the Commission on or before the fifth day and paid by the Corporation on or before the fifteenth day of each month. If any bill remains unpaid for fifteen days the Commission may, in addition to all other remedies and without notice, discontinue the supply of power to the Corporation until said bill is paid. No such discontinuance shall relieve the Corporation from the performance of the covenants, provisoies and conditions herein contained. All payments in arrears shall bear interest at the legal rate.

(d) To take electrical power exclusively from the Commission during the continuance of this agreement.

(e) To co-operate by all means in its power at all times with the Commission to increase the quantity of power required from the Commission and in all other respects to carry out the object of this agreement and of the said Act.

(f) To pay for three-fourths of the power ordered from time to time by the Corporation and held in reserve for it as herein provided, whether it takes the same or not. When the highest average amount of power taken for any twenty consecutive minutes during any month shall exceed during the twenty consecutive minutes three-fourths of the amount ordered by the Corporation and held in reserve, then the Corporation shall pay for this greater amount during the entire month.

(g) If the Corporation during any month takes more than the amount of power ordered and held in reserve for it, as determined by an integrated peak, or highest average, for a period of twenty consecutive minutes,

the taking of such excess shall thereafter constitute an obligation on the part of the Corporation to pay for, and on the part of the Commission to hold in reserve such increased quantity of power in accordance with the terms and conditions of this contract.

(h) When the power factor at any time falls below ninety per cent. (90%) the Corporation shall pay for ninety per cent. (90%) of the kilovolt-amperes, providing that the said ninety per cent. (90%) of said kilovolt-amperes is greater than the maximum kilowatts for any twenty (20) minute period during the month.

(i) To use at all times first-class, modern, standard, commercial apparatus and plant, to be approved by the Commission.

(j) To exercise all due skill and diligence so as to secure satisfactory operation of the plant and apparatus of the Commission and of the Corporation.

3. This agreement shall remain in force for thirty (30) years from date of the first delivery of power under this contract.

4. The power shall be alternating, three-phase, having a periodicity of approximately sixty (60) cycles per second and shall be delivered as aforesaid at a voltage suitable for local distribution.

(a) The meters with their series and potential transformers shall be connected at the point of delivery.

(b) The maintenance by the Commission of approximately the agreed voltage at approximately the agreed frequency at the substation in the limits of the Corporation shall constitute the supply of all power involved herein and the fulfilment of all operating obligations hereunder, and when voltage and frequency are so maintained, the amount of power, its fluctuations, load factor, power factor, distribution as to phases and all other electric characteristics and qualities are under the sole control of the Corporation, their agents, customers, apparatus, appliances and circuits.

5. The engineers of the Commission, or one or more of them, or any other person or persons appointed for this purpose by the Commission, shall have the right from time to time during the continuance of this agreement to inspect the apparatus, plant and property of the Corporation and take records at all reasonable hours.

6. The Commission shall, at least annually adjust and apportion the amount or amounts payable by the municipal corporation or corporations for such power and such interest, sinking fund, cost of lost power, and cost of generating, operating, maintaining, repairing, renewing and insuring said works.

If at any time any other municipal corporation, or pursuant to said Act, any railway or distributing company, or any other corporation or person, applies to the Commission for a supply of power, the Commission shall notify the applicant and the involved corporation or corporations in writing, of a time and place to hear all representations that may be made as to the terms and conditions for such supply.

Without discrimination in favour of the applicants as to the price to be paid for equal quantities of power, the Commission may supply power upon

such terms and conditions, as may, having regard to the risk and expense incurred, and paid, and to be paid by the Corporation, appear equitable to the Commission and are approved by the Lieutenant-Governor in Council.

No such application shall be granted if the said works or any part thereof are not adequate for such supply, or if the supply of the Corporation will be thereby injuriously affected, and no power shall be supplied within the limits of a municipal corporation taking power from the Commission at the time such application is made, without the written consent of such Corporation.

In determining the quantity of power supplied to a municipal corporation, the quantity supplied by the Commission within the limits of the Corporation to any applicant, other than a municipal corporation, shall be computed as part of the quantity supplied to such corporation, but such corporation shall not be liable for payment for any portion of the power so supplied. No power shall be supplied by the municipal corporation to any railway or distributing company without the written consent of the Commission. Power shall not be sold for less than the cost and there shall be no discrimination as regards price and quantity.

7. It is hereby declared that the Commission is to be a trustee of all property held by the Commission under this agreement for the corporation or corporations supplied by the Commission, but the Commission shall be entitled to a lien upon said property for all moneys expended by the Commission under this agreement and not repaid. At the expiration of this agreement the Commission shall determine and adjust the rights of the Corporation and any other (if any) supplied by the Commission, having regard to the amounts paid by them respectively under the terms of this agreement, and such other considerations as may appear equitable to the Commission and are approved by the Lieutenant-Governor in Council.

8. If differences arise between corporations to which the Commission is supplying power, the Commission may upon application fix a time and place and hear all representations that may be made by the parties, and the Commission shall in a summary manner, when possible, adjust such differences and such adjustment shall be final. The Commission shall have all the powers that may be conferred upon a Commissioner appointed under *The Act respecting Enquiries concerning Public Matters.*

9. This agreement shall extend to, be binding upon, and enure to the benefit of the successors and assigns of the parties hereto.

In witness whereof the Commission and the Corporation have respectively affixed their corporate seals and the hands of their proper officers.

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.

(Sgd.) I. B. LUCAS, *Vice-Chairman.*

(Seal).

(Sgd.) W. W. POPE, *Secretary.*

MUNICIPAL CORPORATION OF THE TOWN OF WINGHAM.

(Sgd.) W. H. GURNEY, *Mayor.*

(Seal).

(Sgd.) JOHN F. GROVES, *Clerk.*

RIGHT-OF-WAY

The work of this department for 1920 exceeded both in quantity and area covered that of any year since the inception of the Commission's operations.

The construction of low tension lines in the Counties of Huron and Bruce, being an extension of the Eugenia System necessitated the acquisition of a large number of pole, anchor and tree rights, as also did the extension of the St. Lawrence System in the Counties of Stormont and Glengarry.

A line was also built from Merritton to St. Catharines, and final work was done on several lines on the Central Ontario System as well as on some existing lines of the Niagara System.

Negotiations have been carried on with the Department of Lands and Forests in connection with the right-of-way for the Nipigon Transmission Lines as well as the securing of certain flooding rights required for the development work at Cameron's Falls.

Hydro-Electric Railway Lines

During the early part of the season, operations in connection with the purchase of the right-of-way for the Toronto-St. Catharines Line were commenced and a large percentage of such right-of-way was acquired. On that part of the line between Port Credit and Oakville the greater part of the land was actually purchased and paid for, and between Stony Creek and St. Catharines agreements for the purchase of the greater part of the right-of-way were taken from the owners.

Hanover Quarry and Spur Line Railway

The purchase of the Scanlon Farm, in the Township of Brant, near Hanover, for the purpose of securing a supply of cement material and the purchase of a right-of-way for a railway spur to connect this quarry with the Grand Trunk Railway has been completed. This necessitated the acquisition of thirteen parcels of land.

Essex Railway Lines

The purchase of the Sandwich, Windsor and Amherstburg Railway and The Windsor and Tecumseh Railway necessitated the investigation of the titles of the lands owned by those companies covering over two hundred parcels.

General Operations

To secure additional office accommodation, the building on the corner of Centre avenue and Elm street, in the City of Toronto, recently occupied by the Prest-O-Lite Company, was purchased.

In order to proceed with the proposed power development at Ranney's Falls, it was found necessary to secure additional lands, and a parcel was purchased from The Northumberland Paper and Electric Company.

Right-of-way was secured for the extension of the Cobourg Waterworks System, in that town.

The sale to the Town of Napanee of the Waterworks, and the other properties in that town, no longer required by the Commission, was negotiated and the necessary Order in Council secured from the Government authorizing the transfer.

(These properties came over with the purchase of the assets of the Eastern Power Company.)

The local distribution system and station in Port Colborne was also sold to that municipality and the transfer completed.

Chippawa Development

Twenty-two additional parcels of land required in connection with this work, principally for the right-of-way of the Queenston Power House Railway, and for dredging operations on the Chippawa Creek, were secured during the year.

LOW TENSION LINES

St. Lawrence System

Lines were built and the necessary pole, anchor and guy rights, as well as damage claims were arranged for, on the following lines:—

1. Cornwall Station to Grant's Corners.
2. Grant's Corners to Martintown.
3. Martintown to Apple Hill.
4. Apple Hill to Dominionville Junction.
5. Dominionville Junction to Maxville.
6. Dominionville Junction to Alexandria.
7. Martintown to Williamstown.
8. Williamstown to Lancaster.
9. Toronto Paper Company's Station to Beaver Board Works at Cornwall.

Anchor and Guy rights were secured on the following lines:—

1. Toronto Paper Company's Station to Cornwall Station.
2. Cornwall Station to Farran's Point.
3. Farran's Point to Morrisburg.

Eugenia System

Extensive additions were made to this system in the Counties of Huron and Bruce, the following lines having been constructed and the necessary low-tension rights secured.

1. Hanover to Walkerton.
2. Hanover to Junction Pole.
3. Teeswater to Wingham.
4. Holyrood to Lucknow.
5. Holyrood to Ripley.
6. Walkerton to Teeswater.
7. Teeswater to Teeswater Station.
8. Teeswater to Kinloss.
9. Wingham to Wingham Junction.
10. Kinloss to Holyrood Junction.
11. Kinloss Junction to Kincardine.

Tree rights were secured on the line from Lucan to Ailsa Craig, and a line was constructed and the usual rights secured from Merritton to St. Catharines.

The work of securing the necessary rights was completed on the following lines:

Central Ontario System

1. Healey Falls to Norwood.
2. Healey Falls to Ontario Rock Company's Quarry.
3. Auburn Station to Lakefield.
4. Norwood to Auburn Step-up Station.

Wasdell's System

1. Gamebridge to Kirkfield.

Rideau System

1. Carelton Place to Smith's Falls.

Miscellaneous

Sites for Low-Tension Stations were purchased at Teeswater, Holyrood and Norwood.

Considerable work was done in connection with the Right-of-Way for the High Tension Line between Cameron Falls and Port Arthur.

The terms of the agreement with the Township of Stamford relative to the closing and transfer of certain roads in the Township to the Commission, have been completed.

Settlements have been made of a number of accident claims, chiefly in connection with the Chippawa Development work.

SUMMARY

Settlements effected during the year by this department:

- 132 Pole agreements, covering 752 poles.
- 325 Anchor agreements, for 439 anchors.
- 439 Tree agreements.
- 89 Agreements for miscellaneous and damage claims.
- 206 Agreements for the purchase of land.

It has not been necessary to resort to arbitration on any case during this year.

SECTION II

TRANSMISSION SYSTEMS

HIGH-TENSION TRANSMISSION LINES

Transmission Line Records

The total mileage of lines built and acquired by the Commission up to October 31st, 1920, for the various systems is indicated in the following table:

Niagara System—110,000 volts, steel tower lines.....	466.90	miles.
Niagara System—46,000 volts, and less, steel and wood supports	998.53	"
Ontario Power Company	88.67	"
Essex County System	71.10	"
Severn System	167.89	"
Wasdell's System	78.20	"
Eugenia System	251.31	"
Muskoka System	26.32	"
Nipissing System	24.70	"
Central Ontario System	411.22	"
Rideau System	68.72	"
St. Lawrence System	96.79	"
Thunder Bay System	35.81	"
Total	2,786.16	miles.

110,000-Volt Lines, 25-Cycle—Niagara System

New Sec- tion No.	Old Sec- tion No.	From	To	Length	No. of Steel Towers	Tower No. of cir- cuits	Conductors	Ground Cable	Length of Teleph. Poles	No. and size of Copper B.&S. Telephone Wires	
N.	N.	A	Niagara	51.0	570	2	312,000 c.m. Al. S.R.	5/16"	St.	54.16	2,204
1x2 {	AA	Niagara	Dundas	50.0	451	2	4/0 Copper	5/16"	St.	50.00	1,405
2x13	B	Dundas	Toronto	39.1	431	2	312,000 c.m. Al. S.R.	5/16"	St.	35.87	1,519
13x16 {	BB	Dundas	York	34.6	630	2	5/16"	St.	None	(Towers only erected) 22 No. 8 BWG	
16x3 {	C	Dundas	Brant	22.6	251	2	336,000 c.m. Al. S.R.	5/16"	St.	22.9	957
2x12	D	Brant	Woodstock	21.8	231	2	336,000 c.m. Al. S.R.	5/16"	St.	21.53	888
12x10	E	Woodstock	London	25.4	278	2	336,000 c.m. Al. S.R.	5/16"	St.	26.03	1,074
10x4	F	Dundas	Guelph	25.3	270	1	336,000 c.m. Al. S.R.	5/16"	St.	26.12	1,093
2x5	G-1	Guelph	Preston	10.6	115	1	266,800 c.m. Al. S.R.	5/16"	St.	13.92	535
5x6	G-2	Preston	Kitchener	8.1	91	1	266,800 c.m. Al. S.R.	5/16"	St.	7.95	400
6x7	H	Kitchener	Stratford	25.1	267	1	312,000 c.m. Al. S.R.	5/16"	St.	28.75	1,164
7x8	I	Stratford	St. Mary's	13.5	147	1	266,800 c.m. Al. S.R.	5/16"	St.	15.28	634
8x9	J	St. Mary's	London	23.6	250	1	266,800 c.m. Al. S.R.	5/16"	St.	27.81	1,204
9x4	K	London	St. Thomas	13.4	141	2	266,800 c.m. Al. S.R.	5/16"	St.	16.09	696
4x11	L	St. Thomas	Kent	58.0	486	2	3/0 Copper	5/16"	St.	58.04	2,370
11x14	M	Kent	Essex	44.8	370	2	3/0 Copper	5/16"	St.	44.80	1,829
14x15					466.9					449.25	

Note—Section "A" has fifty miles 312,000 c.m. Al. S.R. and one mile 4/0 Copper.

" "B" has 35.3 miles 312,000 c.m. Al. S.R. and 3.8 miles 4/0 Copper.

" "B" has 3 only circuits of copper telephone two No. 9 and one number 10.

The fourth circuit is No. 8 B.W.G. copper-clad steel.

" "H" has 23.9 miles 312,000 c.m. Al. S.R. and 1.2 miles 266,800 c.m. Al. S.R.

DISTRIBUTION FEEDERS

Wood pole lines were constructed as follows:

Niagara System:

From Ailsa Craig to Parkhill—

4,000-volt, 8.8 miles, completed August 22, 1920.

From Bothwell to Glencoe—

4,000-volt, 11.88 miles, completed May 6, 1920.

From Malvern to Markham—

4,000-volt, 6.1 miles, completed June 28, 1920.

From Junction on L.T. 181 to W. D. Reid & Son, Streetsville—

4,000-volt, .23 miles, completed March 3, 1920.

St. Lawrence System:

From Martintown to Lancaster—

4,000-volt, 11.7 miles, not completed on October 31, 1920.

Preliminary plans were made to change the conductors on the Hanover-Neustadt Line, Eugenia System from No. 6 copper to No. 3-0 S.R. aluminum, on account of increased load in Neustadt. This circuit is 4,000-volt, 6.01 miles in length.

LOW TENSION TRANSMISSION LINES

The following low-tension lines of voltages varying from 2,200 to 110,000 volts were completed and placed in service up to October 31, 1920.

The mileage of these lines is distributed among the various systems, as follows:

Niagara System	998.53
St. Lawrence System	96.79
Severn System	167.89
Wasdell's System	78.20
Eugenia System	251.31
Muskoka System	26.32
Central Ontario System	135.62
Rideau System	68.72
Thunder Bay System	27.56
<hr/>	
	1,850.94 miles

On October 31, 1920, there were under construction 99.30 miles of low-tension transmission lines of voltages varying from 2,200 to 110,000 volts. The mileage of these lines is distributed among the various systems, as follows:

Niagara System .....	.....	.....
St. Lawrence System .....	.....	34.15
Severn System .....	.....	.....
Wasdell's System .....	.....	.....
Eugenia System .....	.....	23.45
Muskoka System .....	.....	.....
Central Ontario System .....	.....	.....
Rideau System .....	.....	.....
Thunder Bay System .....	.....	41.70
<hr/>		99.30 miles

LINES COMPLETED AND UNDER CONSTRUCTION

October 31, 1919 to October 31, 1920

Voltage.	Completed.	Under Construction.	Total.
110,000	27.56	41.70	69.26
44,000	69.98	52.90	122.88
26,400	14.24	.....	14.24
22,000	11.34	.....	11.34
13,200	7.14	.....	7.14
6,600	13.93	.....	13.93
4,000	27.66	4.70	32.36
2,200	2.70	.....	2.70
Total	174.55	99.30	273.85

MILES OF TRANSMISSION LINES COMPLETED AND UNDER CONSTRUCTION BY THE LINE CONSTRUCTION DEPARTMENT FOR THE VARIOUS SYSTEMS

October 31, 1919 to October 31, 1920

Niagara System	34.01
St. Lawrence System	36.63
Severn System .....	.....
Wasdell's System	12.35
Eugenia System	65.10
Muskoka System .....	.....
Central Ontario System	42.26
Rideau System	14.24
Thunder Bay System	69.26
Total	273.85 miles
Span Miles, Single Circuit.....	273.85
" Double Circuit .....	.....
Total	273.85 miles
Power Conductors:	
Steel Reinforced Aluminum	267.91
Aluminum .....	.....
Copper .....	.44
Steel	5.50
Total	273.85 miles
Ground Cable:	
Steel	270.14
Iron .....	.....
Total	270.14 miles
Telephone Wire:	
3 x No. 12 Steel	34.15
3 x No. 13 Steel	97.59
Aluminum, S.R.	72.58
Iron	19.74
Total	224.06 miles
Aluminum:	
1/0 Steel Reinforced	59.60
125,000 C.M. Reinforced	14.20
4/0 Steel Reinforced	97.59
2—Steel Reinforced	91.32
Total	262.75 miles

Copper:				
No. 6 Copper .....				.22
No. 2/0 Copper .....				.22
Total .....				.44 miles
Steel Cable Power:				
5/16" Steel				10.66
Total				10.66 miles
Ground Cable:				
1/4" Steel				19.53
9/32" Steel				184.23
5/16" Steel				66.38
Total				270.14 miles

Average Spans for Poles:
120 ft., 125 ft., 132 ft., 150 ft., 160 ft., 300 ft., 325 ft. and 330 ft.

Total Mileage of Lines and Number of Poles

	To Oct. 31st, 1919	Oct. 31st, 1919, to Oct. 31st, 1920	Totals to Oct. 31st, 1920
Total mileage low tension lines completed	1,676.39	174.55	1,850.94
Total mileage low tension lines under construction..	91.40	99.30	99.30
Total mileage single circuit lines completed.....	1,284.72	174.55	1,459.27
Total mileage double circuit lines completed....	361.48	.....	361.48
Total mileage three circuit lines completed.....	29.09	.....	29.09
Total mileage four circuit lines completed.....	1.10	.....	1.10
Total mileage telephone lines completed.....	1,467.66	129.46	1,597.12
Total mileage telephone lines under construction..	91.40	94.60	94.60
Number of poles erected,.....	76,656	5,500	82,156
Number of towers erected	446	2	448
Number of poles under construction		2,149	2,149

TRANSMISSION AND TELEPHONE LINES

Total Weights and Mileages of Cable and Wire

Cable and Wire	Wire Miles			Weights in Pounds		
	Completed to Oct. 31st, 1919	Completed Oct. 31st, 1919 to Oct. 31st, 1920	Under con- struction Oct. 31st, 1920)	Completed Oct. 31st, 1919	Completed Oct. 31st, 1919 to Oct. 31st, 1920	Under con- struction Oct. 31st, 1920
Aluminum	4,129.81	.....	.....	2,864,381	.....	.....
Steel Reinforced						
Aluminum....	840.55	640.99	292.42	498,928	503,749	276,080
Copper Wire.....	1,069.07	1.32	.....	2,467,351	1,705	.....
Copper Clad Steel	1,217.36	.....	.....	230,466	.....	.....
Galv. Iron Wire...	1,841.48	28.48	11.00	777,242	8,686	3,355
Galv. Steel						
Cable....	1,775.80	111.78	183.68	1,296,669	44,823	104,039
Total.....	10,874.07	782.57	487.10	8,135,037	558,963	383,474

The Mileage of Lines Tabulated According to Voltage and Number of Circuits

**Gauge, Length and Weight of Conductors
TRANSMISSION LINES, INCLUDING GROUND CABLE**

Size of Telephone Wire used on Telephone Lines

COMPLETED OCT. 31, 1919, to OCT. 31, 1920

Section No.	Mileage	Gauge
N472 x 42.....	6.34	No. 6 Steel Reinforced Aluminum
W56 x 6.....	11.34	No. 6 " "
E 8 x 70.....	7.25	No. 6 " "
E70 x 71.....	8.75	No. 6 " "
E71 x 21.....	7.15	No. 6 " "
E71 x 74.....	5.75	No. 6 " "
E74 x 25.....	12.75	No. 6 " "
R55 x 5.....	14.24	No. 9 B.W.G. Iron
P52 x 53.....	9.05	3 x No. 13 Galv. Steel
P53 x 54.....	18.51	3 x No. 13 " "
C14 x 31.....	10.44	3 x No. 13 " "
C31 x 19.....	17.89	3 x No. 13 " "
Total.....	129.46 Miles	.....

Size of Telephone Wire used on Telephone Lines

UNDER CONSTRUCTION OCT. 31, 1920

Section No.	Mileage	Gauge
E21 x 72 "E".....	8.50	No. 6 Steel Reinforced Aluminum
E72 x 22 "E".....	4.75	No. 6 " "
E74 x 24 "E".....	5.50	No. 9 B.W.G. Galv. Iron
L 1 x 66 "E".....	8.06	3 x No. 12 Galv. Steel
L66 x 13 "E".....	4.79	3 x No. 12 " "
L13 x 14 "E".....	5.16	3 x No. 12 " "
L14 x 67 "E".....	2.18	3 x No. 12 " "
L67 x 15 "E".....	8.80	3 x No. 12 " "
L67 x 17 "E".....	5.16	3 x No. 12 " "
P 1 x 51 "E".....	19.13	3 x No. 13 " "
P51 x 52 "E".....	22.22	3 x No. 13 " "
P54 x 2 "E".....	.35	3 x No. 13 " "
Total.....	94.60 Miles	.....

"E" estimated

TELEPHONE LINES

Gauge, Length and Weight of Aluminum, Copper Clad Steel and Galvanized Iron Wire

Gauge	Wire Miles	Weight in Pounds	Single Circuit Mileage		
			Oct. 31st, 1919 Completed to Under con- struction to Oct. 31st, 1920	Oct. 31st, 1919 Completed to Oct. 31st, 1920	Oct. 31st, 1919 Completed to Oct. 31st, 1920
No. 8 B. & S., C.C. steel..	207.52	..... 207.52	50,842 181,638	103.76 503.45	103.76 503.45
No. 10 " "	1,006.90	..... 1,006.90	1,006.90	..... 181,638	..... 503.45
No. 9 B.W.G. Gal. Iron ..	1,437.58	28.48	11.00 283.32	490,108 70,580	498,794 70,580
No. 10 " "	283.32	..... 283.32	283.32	..... 70,580	141.66
No. 3 x 12 Gal. Steel	..... 111.78	68.30	..... 111.78	33,467 44,823	..... 44,823
No. 3 x 13 " "	..... 118.66	83.40	111.78 26.50	33,443 22,070	55.89 22,070
No. 6 S.R. Aluminum	..... 258.92	118.66	118.66 3,194.24	59.33 75,579	13.25 75,194
Total....	2,935.32	189.20	3,194.24 793,168	868,747 1,467,66	129.46 1,597.12

ONTARIO POWER COMPANY'S SYSTEM

Annual Report, October 31, 1920

Considerable attention has been given to the line records of the Ontario Power Company during the past year with a result that a complete tabulation of the lines are available as below:

	Total.
Total Mileage O.P. Co. Lines	88.67
Total Poles Erected O.P. Co. Lines	35.02
Total Steel Towers O.P. Co. Lines.....	1.50
Total Mileage—Single Circuit Lines	8.36
Total Mileage—Double Circuit Lines	80.31
Total Span Miles—52,608 C.M. Alum.	2.00
" " 173,000 " ".....	11.48
" " 345,000 " ".....	43.71
" " 500,000 " ".....	14.06
" " 820,000 " ".....	12.23
	<hr/> 83.48
Total Span Miles—1/0 B. & S. Copper .....	.36
" " 1 " ".....	.29
" " 2 " ".....	1.51
" " 3 " ".....	4.33
" " 6 " ".....	.32
	<hr/> 6.81
Telephone Line:	
Total Span Miles No. 12 B.W.G. Galv. Iron.....	43.08
	<hr/>
Total Wire Miles—52,608 C.M. Alum.....	6.00
" " 173,000 " ".....	58.59
" " 345,000 " ".....	248.31
" " 500,000 " ".....	84.36
" " 820,000 " ".....	73.38
	<hr/> 470.64
Total Wire Miles—1/0 B. & S. Copper.....	1.06
" " 1 " ".....	.87
" " 2 " ".....	4.53
" " 3 " ".....	18.90
" " 6 " ".....	4.32
	<hr/> 29.68
Total Wire Miles No. 12 B.W.G. Galv. Iron.....	86.16
	<hr/>
Total Weight—Wire Miles in Pounds:	
52,608 C.M. Alum.	1,566 lbs.
173,000 " ".....	50,270 "
345,000 " ".....	424,858 "
500,000 " ".....	209,213 "
820,000 " ".....	298,436 "
	<hr/> 984,343 lbs.
Total Weight—Wire Miles in Pounds:	
1/0 B. & S. Copper	1,787 lbs.
1 " " ".....	1,163 "
2 " " ".....	4,806 "
3 " " ".....	15,895 "
6 " " ".....	1,814 "
	<hr/> 25,465 "
Total Weight—Wire Miles in Pounds:	
No. 12 B.W.G. Galv. Iron	14,475 lbs.

ONTARIO POWER COMPANY
TRANSMISSION AND TELEPHONE LINES

Total Weights and Mileage of Cable and Wire

Cable and Wire	Wire Miles	Weight in Pounds
Aluminum Cable	470.64	984,343
Copper Wire	29.68	25,465
Galv. Iron Wire	86.16	14,475

ONTARIO POWER COMPANY

**The Mileage of Lines Tabulated according to Voltages
and Number of Circuits**

Voltage	Single Circuit Totals	Double Circuit Totals	Total Single and Double Circuits
66,000		12.33	12.33
30,000		13.20	13.20
12,000	8.36	54.88	63.24
Total.....	8.36 miles	80.31 miles	88.67 miles

THE ONTARIO POWER COMPANY

Gauge Length and Weight of Conductors—Transmission Lines

B. & S. Gauge	Wire, Miles	Weight, Pounds	Miles, S.C. Lines	Miles, D.C. Lines	Total Single and Double Circuits
52,608 C.M. Alum.....	6.00	1,566	2.00	.....	2.00
173,000 " "	58.59	50,270	3.43	8.05	11.48
345,000 " "	248.31	424,358	4.80	39.06	43.86
500,000 " "	84.36	209,213	.....	14.06	14.06
820,000 " "	73.38	298,436	.....	5.23	6.23
1/0 B. & S. Copper.....	1.06	1,787	.36	.....	.36
1 " "	.87	1,163	.29	.....	.29
2 " "	4.53	4,806	1.51	.....	1.51
3 " "	18.90	15,895	3.48	.85	4.33
6 " "	4.32	1,814	.....	.72	.72
Total	500.32	1,009,808	15.87	68.97	84.84

TELEPHONE LINES

Gauge, Length and Weight of Galvanized Iron Wire

Gauge	Wire, Miles	Weight in Pounds	Single Circuit, Miles
No. 12 B.W.G. Galv. Iron Wire.....	86.16	14,475	43.08
Total.....	86.16	14,475	43.08

Description
ONTARIO POWER

New Section Number	Old Section Number	From	To	Aver. Length of Poles
A2 x 264	A & B	O.P.C. Transf. Station	Jet. Pole No. 358 (Pt. Robinson).	feet 40
A264 x 76	A & B	Jct. Pole No. 358 (Pt. Robinson).	" No. 419 (Glass Co.) ...	35
A276 x 78	A & B	" No. 419 (Glass Co.)....	" No. 443 (Beaver Board)	35
A278 x 19	A & B	" No. 443 (Beaver Board)	Ontario Paper Co.	35
A264 x 4	A & B	" No. 358 (Pt. Robinson).	Port Robinson.....	35
A276 x 16	A & B	" No. 419 (Glass Co.)....	Glass Co.	35
A278 x 18	A & B	" No. 443 (Beaver Board)	Beaver Board Co.	35
A2 x 63	E & F	O.P.C. Transf. Station	Tie Jet. Pole No. 613.....	35
A2 x 261	G & H	O.P.C. Transf. Station	Jet. Pole No. 18 (Niagara Falls City)	35
A261 x 81	G & H	Jet. Pole No. 18 (Niagara Falls City)	Jet. Pole No. 76 (Norton Sub.).	35
A281 x 72	G & H	Jet. Pole No. 76 (Norton Sub.).	" No. 595 (Elect. Metals)	35
A272 x 12	G & H	" No. 595 (Elect. Metals)	Electro Metals	45
A272 x 73	G & H	" No. 595 "	Jet. Pole No. 602 (Can. Steel) ...	35
A273 x 80	G & H	" No. 602 (Can. Steel)...	Empire Cotton Co.	35
A272 x 74	G & H	" No. 595 (Elect. Metals)	Jet. Pole No. 606 (Page Hersey Co.)	35
A274 x 14	G & H	" No. 606 (Page Hersey Co.)	Page Hersey Co.	35
A273 x 13	G & H	Jet. Pole No. 602 (Can. Steel Co.)	Can. Steel Co.	35
A274 x 45	G & H	" No. 606 (Page Hersey Co.)	Dain Manufacturing Co.	35
A2 x 268	J & K	O.P.C. Transf. Station	Jet. Pole No. 18 (Niagara Falls City)	40
A268 x 77	J & K	Jet. Pole No. 18 Niagara Falls City)	Jet. Pole No. 331 (Coniagas Co.).	40
A277 x 17	J & K	Jet. Pole No. 331 (Coniagas Co.).	Coniagas Sub-Station	35
A219 x 77	J & K	" No. 331 "	Ontario Paper Co.	50
A277 x 63	J & K	" No. 331 "	Jet. Pole No. 369 (Thorold)	35
I 51 x 1	J & K	" No. 369 (Thorold)	Thorold Sub-Station	35
A263 x 38	J & K	" No. 369 "	Merritton Sub-Station	35
	J & K	Merritton Sub-Station	Jet. Pole No. 604	35
	J & K	Jet. Pole No. 604	Kinleith Paper Co.	35
	J & K	" No. 604	Jet. Pole No. 614	35
	J & K	" No. 614	Metal Drawing Co.	40
	J & K	" No. 614	St. Catharine's Sub-Station	40
	J & K	" No. 649	McKinnon's Industrial Sub.	45
	J & K	" No. 658	Electric Metal Co.	30
	J & K	" No. 665	Steel Rad. Co.	35
	J & K	" No. 691	Can. Crocker Wheeler Co.	55
A2 x 209	L & M	O.P.C. Transf. Station	Amer. Cyanamid Co.	35
A2 x 269	O & P	"	Jet. Pole No. 98 (Niagara Falls City)	35
A269 x 9	O & P	Jet. Pole No. 98 (Niagara Falls City)	American Cyanamid Co.	35
A2 x 666	R & S	O.P.C. Transf. Station	Jet. Pole No. 30 (C.N.P.Co.)	35
A266 x 81	R & S	Jet. Pole No. 30 (C.N.P.Co.)	" No. 70 (Norton Co.)	35
A281 x 6	R & S	" No. 70 (Norton Co.)	Montrose Sub-Station	35
A16 x 266	R & S	" No. 30 (C.N.P.Co.)	Canadian Niagara Power Co. ....	.....
A265 x 21	R & S	" No. 180 (Chippawa)	Norton Co.	35
A281 x 65	R & S	" No. 70 (Norton Co.)	Jet. Pole No. 180 (Chippawa)	35
A2 x 71	1 & 2	O.P.C. Transf. Station	Niagara River Crossing .....	.....
	21 & 24	" " "	Toronto Power Co.	35
A15 x 2	22 & 23	" " "	Toronto Power Co.	40

of Lines

CO. SYSTEM

Aver. Span	Miles	No. of Poles	Voltage	No. of Circuits	Power Cable	Tel. Wire	Ground Cable	Remarks
feet								
100	6.80	358	12,000	2	345,000 C.M. Alum.	No. 12 Iron	.....	O.P.C. Lines taken over by H.E.P.C., Aug. 1, 1917
120	1.37	61	"	2	" "	" "	.....
120	.53	24	"	2	" "	" "	.....
120	.70	32	"	2	" "	" "	.....
120	2.00	122	"	1	52,608	" "	.....
120	.04	2	"	2	345,000	" "	.....
120	.04	2	"	2	" "	No. 12 Iron	.....
120	13.20	613	30,000	2	" "	.....	.....
120	.41	18	12,000	2	" "	No. 12 Iron	.....	" D " Line Taps " H " Line
120	1.32	58	"	2	" "	" "	.....	Disconnected
120	11.79	519	"	2	1/0 B. & S. Copper	.....	.....
120	.36	16	"	2 { 3	" "	.....	.....
120	.15	7	"	2 { 3	" "	No. 12 Iron	.....
120	1.70	75	"	2 { 345,000 C.M. Alum.	" "	.....	.....
120	.25	11	"	2 { 3 B. & S. Copper	No. 12 Iron	.....	.....
120	.20	9	"	2 { 3	" "	" "	.....
120	.25	18	"	2 { 3	" "	" "	.....
120	1.52	67	"	1	173,000 C.M. Alum.	" "	.....
120	.40	18	"	2	500,000	" "	.....	" C " Line Taps " J " Line
120	7.12	313	"	2	" "	" "	.....
120	.72	132	"	2	6 B. & S. Copper	" "	.....
120	.13	7	"	2	500,000 C.M. Alum.	" "	.....
120	.90	40	"	2	345,000	" "	.....
120	1.04	46	"	1	3 B. & S. Copper	.....	.....	Owned by H.E.P.C.
120	2.45	108	"	2	173,000 C.M. Alum.	No. 12 Iron	.....
120	2.88	127	"	2	" "	.....	.....
120	1.51	22	"	1	2 B. & S. Copper	.....	.....
120	.22	10	"	2	345,000 C.M. Alum.	No. 12 Iron	.....
120	.04	2	"	2	2 B. & S. Copper	" "	.....
120	1.02	45	"	2	345,000 C.M. Alum.	" "	.....	Owned by St. Catharine's Hydro System
120	1.95	86	"	1	3 B. & S. Copper	.....	.....
120	.20	13	"	2 { 345,000 C.M. Alum.	" "	.....	.....
120	.21	11	"	1	173,000 C.M. Alum.	.....	.....
120	.13	6	"	1	3 B. & S. Copper	.....	.....
100	2.67	141	"	2	500,000 C.M. Alum.	.....	.....
100	1.85	98	"	2	" "	No. 12 Iron	.....	" C " Line Taps " O " Line
100	.76	40	"	2	" "	" "	.....
130	.74	30	"	2 { 336,420	" "	.....	.....
130	.98	40	"	2 { 345,000	" "	.....	.....
130	1.23	50	"	2	" "	.....	.....
120	.22	10	"	2	173,000 C.M. Alum.	No. 12 Iron	.....
120	2.50	110	"	2	" "	.....	.....	Disconnected
550 { 6.00	6.23	75 { 75	66,000	2	820,000	" "	.....
120	.72	32	12,000	2	345,000	" "	.....	Disconnected
100	1.13	60	"	2	500,000	" "	.....



Standard wishbone construction, Nipigon Transmission Line, looking north about three miles to Generating Station. (Ground wire not placed.)

Nipigon Lines

Construction work on the first wood pole line from Cameron's Falls to Nipigon to operate at 110,000 volts proceeded throughout the year and is practically ready for testing. In the course of the year an application has been received for power at Nipigon and a wood pole line is being constructed north-easterly along the C.P.R. from Sprucewood Junction so as to serve the local pulp industry. Surveys are also being made for the completion of a loop line from Cameron's Falls to Sprucewood by way of Nipigon.

Bruce and Huron County Lines

Extension of the Eugenia System westerly from Hanover so as to serve municipalities in the Counties of Bruce and Huron has taken a great part of the time of the construction force during the year. These lines conform largely to standard practice at 26,000 volts, with the exception that a larger insulator has been used so as to provide amply for subsequent operation, star connected.

St. Lawrence System Extensions

During the year considerable progress has been made with the building of 44,000 volt lines north and east from Cornwall station so as to serve a number of municipalities in this district, particularly Martintown and Lancaster. This work is nearing completion at the close of the fiscal year.

Restrunging of Conductors

A considerable part of the construction work during the year has involved the removal of the small capacity conductors originally erected on various low tension lines and replacing them with conductors of ample size for the existing load and so as to take care of the expected demand during the next four or five years. A considerable part of this work was in the Wasdell's System between Wasdell's Falls and Cannington.

Description
NIAGARA

New Section No.	Old Sec. No.	From	To	Aver. Length of Poles.	Aver. Span.	Miles	No. of Poles	Voltage.
N.	L.T.			feet	feet			
2 x 201	1	Dundas H.T. Station.	Hamilton	50½	206	2.85	73	13,200
7 x 762	4	Kitchener H.T. Stat..	Junction Pole No. 9 ..	40	120	.18	10	..
762 x 2	5	Junction Pole No. 9 ..	Waterloo Mun. Stat..	40	120	1.64	79	..
762 x 1	6	Pole No. 10	Kitchener Mun. Stat.	45	120	.76	34	..
7 x 765	7	Kitchener H.T. Stat.	Junction Pole No. 405 ..	40	120	9.09	405	..
765 x 66	7	Junction Pole No. 405 ..	" " No. 463 ..	40	120	1.29	58	..
766 x 37	7	" " No. 463 ..	New Hamburg Dis.St.	40	120	1.89	92	..
765 x 35	7a	" " No. 405 ..	Baden Dis. Stat.....	40	120	.11	7	..
10 x 1062	8	Woodstock H.T. Stat.	Junction Pole No. 76 ..	40	120	1.57	76	..
1062 x 64	8	Junction Pole No. 76 ..	" " No. 289 ..	40	120	4.70	213	..
1064 x 73	8	" " No. 289 ..	Pole No. 324	40	120	.83	35	..
1073 x 5	8	Pole No. 324	Ingersoll Mun. Stat..	40	120	2.80	131	..
10 x 1066	9	Woodstock H.T. Stat.	Junction Pole No. 508 ..	40	120	11.08	508	..
1066 x 9	10	Junction Pole No. 508 ..	Tillsonburg Mun. Sta..	40	120	10.30	467	..
1066 x 36	11	" " No. 508 ..	Norwich Dis. Station	40	120	4.59	208	..
1036 x 8	11a	Norwich Dis. Stat. ..	Otterville	30	160	4.50	158	2,300
1036 x 7	11b	" ..	Burgessville	30	160	3.25	115	..
11 x 1101	12	St.Thomas. H.T. Sta.	St. Thomas Mun. Sta.	40&45	120	1.13	47	13,200
6 x 664	14	Preston H.T. Station	Junction Pole No. 99 ..	45	120	2.04	99	{ 6,600
664 x 4	15	Junction Pole No. 99 ..	Hespeler Mun. Stat..	40	120	2.09	99	{ 13,200
664 x 3	16	" " No. 99 ..	Galt Mun. Station...	40	120	3.75	175	13,200
6 x 601	17	Preston H.T. Station	Preston Corp. Station	35	120	.14	11	6,600
4 x 469	18	London H.T. Station	Junction Pole No. 38 ..	40	120	.81	38	13,200
469 x 70	19	Junction Pole No. 38 ..	" " No. 99 ..	45	120	1.38	61	..
470 x 17	19	" " No. 99 ..	Asylum, London	45	120	.16	11	..
4 x 401	21	London H.T. Station	London Mun. No. 1 ..	40	120	3.57	178	..
469 x 1	20 &							
13 x 1361	22	Junction Pole No. 38 ..	London	40	120	2.91	151	..
13 x 1361	26	Cooksville H.T. Stat.	Junction Pole No. 6 ..	40	120	.08	6	..
1361 x 62	26	Junction Pole No. 6 ..	" " No. 84 ..	40	120	1.79	78	..
1362 x 31	26	" " No. 84 ..	Port Credit Dis. Stat.	40	120	.32	16	..
1331 x 2	26a							
13 x 1363	27	Port Credit Dist. Stat.	Pt.Credit Brick Wks.	45	120	.88	43	..
1363 x 64	27	Cooksville H.T. Stat.	Junction Pole No. 30 ..	40	120	.57	30	..
1364 x 68	27	Junction Pole No. 30 ..	" " No. 89 ..	40	120	1.32	59	..
1368 x 4	27	" " No. 89 ..	" " No. 230 ..	40	120	3.18	141	13,200
1368 x 4	27	" " No. 230 ..	Brampton Mun. Sub..	40	120	6.17	276	..
866 x 6	28	" " No. 1550 ..	Clinton Mun. Sub....	40	120	1.27	62	26,400
865 x 5	29	" " No. 1153 ..	Seaforth "	40	120	1.50	74	..
863 x 3	30	" " No. 647 ..	Mitchell "	40	120	1.27	59	26,400
5 x 562	31	Guelph H.T. Station .	Junction Pole No. 70 ..	40	120	1.46	70	13,200
562 x 2	31	Junction Pole No. 70 ..	Ont. Agric. College ..	40	120	.10	8	..
5 x 501	32	Guelph Struc. on Stat.						
1364 x		Property						
1664	34	Junction Pole No. 89 ..	Junction Pole No. 419 ..	40	120	.08	5	..
1664 x 63	34	" " No. 419 ..	" " No. 564 ..	40	120	7.30	330	..
1663 x 3	34	" " No. 564 ..	Weston Mun. Station	40	120	3.24	145	..
601 x 2	35	Preston H.T. Stat. ..	Galt P. & H. Ry.....	40	120	1.62	75	..
1362 x								
1661	36	Junction Pole No. 84 ..	Junction Pole No. 332 ..	45	120	5.48	250	13,200
1631 x 61	36	" " No. 332 ..	Etobicoke Dis. Stat...	45	120	.11	6	..
2 x 266	38	Dundas H.T. Station.	Junction Pole No. 260 ..	40	120	5.44	260	..
266 x 35	38	Junction Pole No. 260 ..	Dom. Sewer Pipe Co.	40	120	1.93	90	..
235 x 6	40 &							
40a		Dom. Sewer Pipe Co.	Waterdown	35	120	3.43	72	2,200
11 x 1168	41	St. Thomas H.T. Stat.	Junction Pole No. 112 ..	35	120	2.24	112	13,200

of Lines

SYSTEM

No. of Circuits	Power Cable, B. & S. Gauge	Telephone Wire, B. & S. & B.W.G. Gauge	Ground Cable	Work Commenced	Work Completed	In Operation
4	4/0 H.D. Copper	8 B&S Iron Wire	1" Gal. Steel	Apr. 7, 1915	Sept. 24, 1915	Oct. 4, 1915
4	1/0 Alum.	10 B&S C.C. Steel	1"	Aug. 25, 1910	Sept. 11, 1910	
2	1/0 "	10 "	1"	Sept. 11,	Nov. 25,	
2	1/0 "	10 "	1"	Aug. 25,	Sept. 11,	
2	2 "	10 "	1"	Sent. 11,	Jan. 2, 1911	Feb. 3, 1911
2	2 "	10 "	1"	Sept. 11,	Jan. 2,	Feb. 3,
2	2 "	10 "	1"	Sept. 11,	Jan. 2,	Feb. 3,
2	2 "	10 "	1"	Sept. 11,	Jan. 2,	Feb. 3,
2	1/0 "	10 "	1"	Nov. 14, 1910	Mar. 28, 1911	
2	1/0 "	10 "	1"	Nov. 14,	Mar. 28,	
2	1/0 "	10 "	1"	Nov. 14,	Mar. 28,	
2	1/0 "	10 "	1"	Nov. 14,	Mar. 28,	
2	1/0 "	10 "	1"	Jan. 2, 1911	Apr. 29,	
2	1/0 "	10 "	1"	Jan. 2,	Apr. 29,	
1	2 "	10 "	1"	Feb. 13,	Mar. 30,	
1	No. 6 Copper	.....	1"	.....	.....	1916
1	No. 6	.....	1"	.....	.....	Dec. 7 1916
2	1/0 Alum	10 B&S C.C. Steel.	1"	Dec. 14, 1910	Dec. 30, 1910	
3 { 1-2	"	10 "	1"	Oct. 8, 1910	Jan. 19, 1911	
3 { 2-4/0	"	10 "	1"	Oct. 8,	Dec. 30, 1910	
1	2 "	10 "	1"	Oct. 8,	Jan. 19, 1911	
2	4/0 "	10 "	1"	Built by Preston Corporation		
1	2 Copper	10 "	1"			
4 { 1-3/0	Alum	10 "	1"	Oct. 26, 1910	Jan. 10, 1911	
3 { 3-2	"	10 "	1"	Oct. 26,	Jan. 19,	
3	2 "	10 "	1"	Oct. 26,	Jan. 19,	
1	2 "	10 "	1"	Oct. 26,	Jan. 19,	
2	3/0 "	10 "	1"	Oct. 20,	Jan. 20,	
1	3/0 "	.....	1"	Oct. 24,	Jan. 20,	
2	2 "	10 B&S C.C. Steel	1"	Feb. 24, 1911	July 10,	
2	2 "	10 "	1"	Feb. 24,	July 10,	
2	2 "	10 "	1"	Feb. 24,	July 10,	
2	2 "	10 "	1"	Apr. 5,	July 23,	
2	2 "	10 "	1"	Feb. 15,	May 6,	
2	2 "	10 "	1"	Feb. 15,	May 6,	
2	2 "	10 "	1"	Feb. 15,	May 6,	
2	2 "	10 "	1"	Feb. 15,	May 6,	
2	3/0 "	10 "	1"	Apr. 6,	Aug. 4,	
2	2 "	10 "	1"	Mar. 25,	Sept. 13,	
2	2 "	10 "	1"	Mar. 24,	Aug. 3,	
2 { 1-1/0	"	10 "	1"	July 21,	Nov. 9,	
2 { 1-3/0	"	10 "	1"	July 21,	Nov. 9,	
1	1-1/0 "	10 "	1"	July 21,	Nov. 9,	
3	1/0 "	10 "	1"	Aug. 7,	Sept. 3,	Sep. 4, 1911
2	2 "	8 "	1"	Apr. 19,	July 24,	
2	2 "	8 "	1"	Apr. 19,	July 24,	
2	2 "	8 "	1"	Apr. 19,	July 24,	
1	1/0 "	10 "	1"	Mar. 13,	Mar. 21,	
2 { 1-No. 2 S.R. Alum	"	8 "	1"	Apr. 26,	Feb. 29, 1912	
2 { 1-2 Alum.	"	8 "	1"	Apr. 26,	Feb. 29,	
2 { 1-No. 2 S.R. Alum	"	8 "	1"	Apr. 26,	Feb. 29,	
2 { 1-2 Alum.	"	8 "	1"	July 21,	Dec. 19, 1911	Apr. 6, 1912
1	2 "	8 "	1"	July 21,	Dec. 19,	Apr. 6,
1	2 "	8 "	1"	Sept. 30,	Oct. 10,	Apr. 6,
1	2 "	8 "	1"	Oct. 16,	Mar. 8, 1912	Mar. 9,

Description of

NIAGARA

New Section No.	Old Sec. No.	From	To	Aver. Length of Poles	Aver. Span	Miles	No. of Poles	Voltage
N.	L.T.			feet	feet			
1168 x 37	41	Junction Pole No. 112	Port Stanley Dis. Sta.	35	120	10.03	462	13,200
1034 x 13	42	Beachville Dis. Stat.	Beachville(cable only)	.....	.....	1.00	.....	2,200
2 x 263	43	Dundas H.T. Station.	Junction Pole No. 69.	40	120	1.21	65	13,200
735 x 6	44	Baden Dis. Stat.	Wellesley	30	150	7.92	252	4,000
1064 x 34	45	Junction Pole No. 289	Beachville Dis. Stat.	30	50	.01	1	13,200
9 x 961	46	St. Mary's H.T. Stat.	Junction Pole No. 33.	40	120	.67	33	"
961 x 32	46	Junction Pole No. 33.	St. Mary's Por. Cem. D.S.	40	120	1.55	49	"
2 x 237	47	Dundas H.T. Station.	Caledonia Dis. Stat..	40	120	14.97	669	"
237 x 8	47a	Caledonia Dis. Stat..	Alabastine Co. ....	.....	.....	.17	.....	2,200
237 x 70	48	"	Junction. Pole No. 941	40	120	6.10	267	13,200
270 x 39	49	Junction Pole No. 941	Hagersville Dis. Stat.	40	120	3.85	173	"
270 x 10	50	"	Ontario Gypsum Co..	40	120	5.91	229	"
1631 x 61	51	Etobicoke Dis. Stat..	Junction Pole No. 332	40	120	.11	6	"
1661 x 32	51	Junction Pole No. 332	Mimico Dis. Station .	40	120	.46	18	"
738 x 8	52	Metering Station	St. Petersburg and St. Agatha.....	.....	.....	.....	76	.....
11 x 1162	55	St. Thomas H.T. Stat.	Junction Pole No. 5..	40	120	.04	5	13,200
1162 x 2	55	Junction Pole No. 5..	London & Lake Erie Ry.	40	120	1.65	83	"
562 x 63	57	" " No. 70.	Junction Pole No. 118	40	120	1.07	48	"
563 x 65	57	" " No. 118	" " No. 155	40	120	.86	37	"
565 x 5	57a	" " No. 155	Prison Farm.....	40	120	.08	3	"
565 x 66	58	" " No. 155	Junction Pole No. 453	40	120	6.41	298	"
566 x 67	59	" " No. 453	" " No. 717	40	120	5.78	264	"
567 x 37	59	" " No. 717	Acton Dis. Station...	40	120	.07	5	"
237 x 7	61	Caledonia Dis. Stat..	Caledonia .....	.....	.....	.30	.....	2,200
1368 x 69	62	Junction Pole No. 230	Junction Pole No. 381	40	120	3.36	151	13,200
1369 x 8	62	" " No. 381	Milton Mun. Station .	40	120	13.36	592	"
567 x 68	65	" " No. 717	Junction Pole No. 1005	40	120	6.37	288	"
568 x 39	65	" " No. 1005	Georgetown Dis. Sta.	40	120	2.68	121	"
566 x 36	66	" " No. 453	Rockwood	35	120	1.64	77	"
1261 x 68	68	" " No. 19.	Junction Pole No. 40.	40	120	.44	21	26,400
1268 x 8	68	" " No. 40.	Paris Mun. Station..	40	120	2.44	110	"
12 x 1261	69	Brant H.T. Station..	Junction Pole No. 19.	40	120	.33	19	"
1261 x 62	69	Junction Pole No. 19.	" " No. 272	40	120	5.38	253	"
1262 x 1	69	" " No. 272	Brantford Mun. Stat.	40	120	.95	45	"
1262 x 2	69a	" " No. 272	L.E. & N.Rly., Brant- ford.....	.....	125	.02	.....	"
702 x 33	71	Waterloo Mun. Stat..	St. Jacob's Dis. Stat.	40	120	6.28	299	13,200
733 x 34	71	St. Jacob's Dis. Stat..	Elmira	40	120	4.62	218	"
6 x 605	72	Preston H.T. Station	Breslau	40	120	6.35	292	6,600
1 x 170	73	Niagara H.T. Station	Junct. Tower No. 118	48	250	5.01	118	46,000
170 x 61	74	Junct. Tower No. 118	" " No. 308	48	250	8.59	190	"
161 x 10	74	" " No. 308	Union Carbide Co....	48	250	1.93	49	"
161 x 1	75	" " "	Welland E. S. & M. Co.	48	250	1.20	28	"
469 x 39	76	Junction Pole No. 38 .	Dorchester Dis. Stat.	35	132	6.17	219	13,200
439 x 67	77	Dorchester Dis. Stat.	Junction Pole No. 388	35	132	4.02	132	"
467 x 6	77	Junction Pole No. 388	Thorndale Mun. Stat.	35	132	2.47	179	"
439 x 8	78	Dorchester Dis. Stat.	Thamesford	35	132	5.88	280	"
1369 x 39	79	Junction Pole No. 381	Streetsville Dis. Stat.	45	120	.41	19	"
1339 x 67	79a	Streetsville Dis. Stat.	Junction Pole No. 27.	35	120	.53	22	4,000
1367 x 5	79a	Junction Pole No. 27.	Milton Brick Co. Streetsville	35	120	.77	36	4,000
15 x 1562	81	Essex H.T. Station ..	Junction Pole No. 55.	45	120	1.10	55	26,400
1562 x 1	82	Junction Pole No. 55.	Windsor Mun. Station	45	120	2.27	103	"
1562 x 2	83	" "	Walkerville	40	120	1.30	62	"
14 x 1462	84	Kent H.T. Station ...	Junction Pole No. 41	40	120	.82	41	"
1462 x 1	84	Junction Pole No. 41.	Chatham Mun. Stat..	40	120	1.11	59	"

Lines—Continued

SYSTEM

Description of

NIAGARA

New Section No.	Old Sec. No.	From	To	Aver. Length of Poles	Aver. Span.	Miles	No. of Poles	Voltage
N.	L.T.			feet	feet			
563 x 64	85	Junction Pole No. 118	Junction Pole No. 776	40	120	14.64	658	13,200
564 x 33	86	" " No. 776	Elora Dis. Station...	40	120	1.18	57	"
564 x 34	87	" "	Fergus "	35	120	1.96	92	"
1208 x 69	88	Paris Mun. Station...	Junction Pole No. 196	35 & 40	132	1.09	49	26,400
1269 x 70	88	Junction Pole No. 196	" " No. 448	35 & 40	132	6.14	252	"
1270 x 40	89	" " No. 448	Ayr Dis. Station	35	120	1.20	56	"
1270 x 71	90	" "	Junction Pole No. 636	35	132	4.53	188	"
1271 x 72	90	" " No. 636	" " No. 713	35	132	1.80	77	"
1272 x 41	90	" " No. 713	Drumbo Dis. Station.	35	132	.50	21	"
1241 x 13	91	Drumbo Dis. Station	Princeton	35	132	5.65	234	4,000
1241 x 74	92	" "	Junction Pole No. 714	35	132	.49	21	"
1274 x 12	92	Junction Pole No. 714	Plattsburgh.....	35	132	6.84	269	"
467 x 7	93	" " No. 388	Dellers Bros	25	132	.89	42	2,200
568 x 38	94	" " No. 1005	Cheltenham	35	132	5.06	218	13,200
4 x 463	95	London H.T. Station.	Junction Pole No. 462	40	120	10.13	457	"
463 x 62	96	Junction Pole No. 462	" " No. 760	40	120	6.59	298	"
462 x 64	97	" " No. 760	" " No. 944	40	120	3.99	184	"
464 x 5	98	" " No. 944	Strathroy Mun. Stat.	40	120	9.27	425	"
470 x 72	99	" " No. 99	Junction Pole No. 757	35 & 40	132	16.18	659	"
472 x 40	99	" " No. 757	Lucan Dis. Station ..	35 & 40	132	3.00	123	"
100	100	Niagara H.T. Station	Electric Develop't. Co.	45	100	1.02	52	12,000
1462 x 32	101	Junction Pole No. 41.	Tilbury Dis. Station.	35	132	17.54	84	26,400
14 x 1468	102	Kent H.T. Station ...	Junction Pole No. 68.	40	120	1.48	68	"
1468 x 69	103	Junction Pole No. 68.	" " No. 520	40	120	9.98	452	"
1469 x 39	104	" " No. 520	Wallaceburg Dis. Sta.	40	120	8.50	385	"
1469 x 70	105	" "	Junction Pole No. 795	40	132	6.71	275	"
1470 x 40	105	" " No. 795	Dresden Dis. Station.	40	132	.68	33	"
1064 x 33	106	" " No. 289	Embro "	35	132	6.04	256	13,200
1663 x 34	107	" " No. 564	Woodbridge "	35	132	6.44	276	"
1634 x 5	108	Woodbridge Dist. Sta.	Bolton.....	35 & 40	132	12.95	540	"
1062 x 2	109	Junction Pole No. 76	W. T. & V. & I. Ry...	.....	.....	.02	2	"
1632 x 66	110	Mimico Dis. Station	Junction Pole No. 12.	30	125	.22	12	2,200
1666 x 67	110	Junction Pole No. 12	" " No. 33.	30	125	.55	21	"
1268 x 64	111	" " No. 40	" " No. 253	35 & 40	132	5.86	228	26,400
1264 x 34	112	" " No. 253	Burford Dis. Station.	35	132	3.48	142	"
1264 x 65	113	" "	Junction Pole No. 869	35 & 40	132	15.06	616	"
1265 x 35	113a	" " No. 869	Waterford D.S.....	40	132	.09	4	"
1265 x 67	114	" "	Junct. Pole No. 1230.	35	132	8.81	361	"
1267 x 6	114	" " No. 1230	Simcoe Mun. Station.	35	132	.06	5	"
1267 x 7	114a	" "	L. E. & N. Ry. Simcoe	45	120	.25	11	"
1432 x 3	115	Tilbury Dis. Station	Comber.....	30	132	7.26	306	4,000
432 x 3	116	Delaware Dis. Stat...	Lambeth .....	.....	.....	6.59	.....	"
432 x 4	117	" "	Mount Brydges .....	.....	.....	3.99	.....	"
263 x 64	118	Junction Pole No. 69.	Junction Pole No. 82.	55	120	.25	13	13,200
264 x 2	118	" " No. 82.	Dundas Mun. Station	55	120	.12	7	"
462 x 32	119	" " No. 760	Delaware Dis. Station	55	120	.09	5	"
11 x 1162	121	St. Thomas H.T. Stat.	Junction Pole No. 5..	30	132	.04	5	"
1162 x 64	121	Junction Pole No. 5 ..	" " No. 753	30	132	18.33	748	"
1164 x 34	121	" " No. 753	Dutton Dis. Station..	30	132	.16	7	"
1435 x 6	122	Ridgetown Dis. Stat.	Highgate	30	120	6.18	10	4,000
1468 x 65	123	Junction Pole No. 68.	Junction Pole No. 470	35	132	9.74	402	26,400
1465 x 67	123	" " No. 470	" " No. 676	35	132	4.78	206	"
1467 x 37	123	" " No. 676	Thamesville D.S.....	35	132	.09	6	"
1467 x 38	124	" " No. 676	Bothwell Dis. Station	35	132	9.83	407	"
8 x 832	125	Stratford H.T. Stat..	Tavistock	35	132	9.72	398	"
1468 x 34	126	Junction Pole No. 69.	Blenheim	35	132	9.52	388	"
1465 x 66	127	" " No. 470	Junction Pole No. 783	35	132	7.52	313	"
1466 x 35	127	" " No. 783	Ridgetown Dis. Stat.	35	132	.43	20	"

Lines—Continued

SYSTEM

No. of Circuits	Power Cable, B. & S. Gauge	Telephone Wire, B. & S. & B.W.G. Gauge	Ground Cable	Work Commenced	Work Completed	In Operation
1	3/0 Alum.	10 B&S C.C. Steel	1/4" Gal. Steel..	June 3, 1914	Oct. 17, 1914	Oct. 22, 1914
1	3/0 "	10 " "	1/4" "	Aug. 18, "	Oct. 28, "	Oct. 22, "
1	3/0 "	10 " "	1/4" "	Aug. 1, "	Oct. 13, "	Oct. 22, "
1	1/0 "	10 " "	1/4" "	July 21, "	Nov. 30, "	Dec. 1, "
1	1/0 "	10 " "	1/4" "	July 21, "	Nov. 30, "	Dec. 1, "
1	1/0 "	10 " "	1/4" "	Sept. 15, "	Nov. 30, "	Dec. 1, "
1	1/0 "	10 " "	1/4" "	July 13, "	Nov. 30, "	Dec. 1, "
1	1/0 "	10 " "	1/4" "	July 13, "	Nov. 30, "	Dec. 1, "
1	1/0 "	10 " "	1/4" "	July 13, "	Nov. 30, "	Dec. 1, "
1	No. 6 Copper	.....	1/4" "	Aug. 17, "	Nov. 30, "	Dec. 18, "
1	No. 4 "	.....	1/4" "	Aug. 17, "	Nov. 30, "	Dec. 1, "
1	No. 4 "	.....	1/4" "	Aug. 17, "	Nov. 30, "	Dec. 1, "
1	No. 6 "	.....	No. 8 B & S C.C. Stell as neutral	Mar. 19, "	Mar. 15, 1915	Mar. 19, 1915
1	1/0 Alum.	10 B&S C.C. Steel	1/4" Gal. Steel	June 10, "	June 30, 1914	July 3, 1914
1	3/0 "	10 " "	1/4" "	Sept. 1, "	Nov. 30, "	Nov. 30, "
1	3/0 "	10 " "	1/4" "	Oct. 15, "	Nov. 30, "	Nov. 30, "
1	3/0 "	10 " "	1/4" "	Sept. 29,	Nov. 30, "	Nov. 30, "
1	3/0 "	10 " "	1/4" "	Sept. 14,	Nov. 30, "	Nov. 30, "
2	2 S.R. "	10 BWG Gal. Iron	1/4" "	Oct. 23, "	Jan. 20, 1915	Jan. 21, 1915
2	2 S.R. "	10 " "	1/4" "	Oct. 23, "	Jan. 20, "	Jan. 21, "
2	4/0 Copper	9 " "	1/4" "	Oct. 27, 1915	Oct. 31, "	Oct. 31, "
1	2 S.R. Alum.	10 B&S C.C. Steel	1/4" "	Jan. 13, "	May 12, "	Mar. 3, "
3	2-3/0 "	10 B&S HD Copp.	1/4" "	Oct. 28, 1914	Feb. 3, "	Feb. 3, "
2	1-1/0 "	10 " "	1/4" "	Oct. 30, "	Feb. 3, "	Feb. 3, "
2	3/0 "	10 " "	1/4" "	Nov. 6, "	Feb. 3, "	Feb. 3, "
2	3/0 "	10 " "	1/4" "	Nov. 3, "	May 1, "	Mar. 30, "
2	3/0 "	10 " "	1/4" "	Nov. 3, "	May 1, "	Mar. 30, "
1	1" Gal. Steel	10 B&S C.C. Steel	1/4" "	Oct. 1, "	Dec. 24, 1914	Dec. 22, 1914
1	1/0 Alum.	10 " "	1/4" "	Sept. 25,	Oct. 21, "	Dec. 2, "
1	3/0 "	10 B&S C.C. Steel	1/4" Gal. Steel	Oct. 20, 1914	Nov. 26, 1914	Jan. 26, 1915
1	2 "	10 " "	1/4" "	Sept. 12, "	Sep. 12, "	Sep. 13, 1914
1	2/0 Copper	.....	1/4" "	Oct. 24,	Feb. 17, 915	Feb. 17, 1915
1	2/0 "	.....	1/4" "	Oct. 24,	Feb. 17,	Feb. 17,
1	2 S.R. Alum.	10 B & S Copper	1/4" "	Nov. 6, "	May 4, "	May 6, "
1	2 "	10 B&S HD Copp.	1/4" "	Nov. 21, "	May 28, "	May 6, "
1	2 "	10 " "	1/4" "	Nov. 21, "	May 5, "	May 10, "
1	2 "	10 " "	1/4" "	Nov. 21, "	May 5, "	May 10, "
1	2 "	10 " "	1/4" "	Nov. 26, "	May 7, "	May 9, "
1	2 "	10 " "	1/4" "	Nov. 26, "	May 7, 1915	May 9, "
1	2 "	10 BWG Gal. Iron	1/4" "	.....	.....	July 14, 1916
1	2 "	.....	1/4" "	Jan. 14, 1915	May 8, 1915	Apr. 20, 1915
1	6 M.H.D. Copper	.....	1/4" "	Jan. 25,	Mar. 12, "	Mar. 15, "
1	6 "	.....	1/4" "	Jan. 7, "	Jan. 23, "	Mar. 1, "
2	2 Copper	10 B & S Copper	1/4" Gal. Steel	Feb. 25, "	Mar. 15, "	Mar. 15, "
2	2 "	10 " "	1/4" "	Feb. 25, "	Mar. 15, "	Mar. 15, "
1	2 "	10 B&S C.C. Steel	1/4" "	Jan. 27, "	Mar. 9, "	Feb. 1, "
1	1/0 Alum.	.....	1/4" "	May 3, "	Aug. 21, "	Aug. 27, "
1	1/0 "	.....	1/4" "	May 3, "	Aug. 21, "	Aug. 27, "
1	1/0 "	.....	1/4" "	May 3, "	Aug. 21, "	Aug. 27, "
1	6 M.H.D. Copper	.....	6 B.W.G. G.Iron	Oct. 3, 1916	Nov. 4, 1916	Nov. 6, 1916
1	1/0 Alum.	9 BWG Gal. Iron	1/4" Gal. Steel	May 18, 1915	July 14, 1915	Sep. 14, 1915
1	1/0 "	9 " "	1/4" "	May 18, "	July 14, "	Sep. 14, "
1	1/0 "	9 " "	1/4" "	May 18, "	July 14, "	Sep. 14, "
1	2 S.R. Alum.	9 " "	1/4" "	June 26,	Aug. 17, "	Aug. 17, "
1	6 BWG Gal. Iron	9 " "	6 B.W.G.G.Iron	Sept. 9, "	Sep. 5, 1916	Oct. 26, 1916
1	2 S.R. Alum.	9 " "	1/4" Gal. Steel	July 2, "	Oct. 7, 1915	Oct. 20, 1915
1	2 "	9 " "	1/4" "	June 24,	Sep. 7, "	Nov. 24, "
1	2 "	9 " "	1/4" "	June 24,	Sep. 7, "	Nov. 24, "

Description of
NIAGARA

New Section No.	Old Sec. No.	From	To	Aver. Length of Poles	Aver. Span	Miles	No. of Poles	Voltage
N.	L.T.			feet	feet			
12 x 1203	128	Brant H.T. Station ..	St. George	30	132	9.19	199	4,000
264 x 71	129	Junction Pole No. 82.	Junction Pole No. 328	35	132	5.78	245	13,200
271 x 34	129	" " No. 328	Lynden Dis. Station ..	35	132	4.53	185	"
440 x 12	130	Lucan Dis. Station ..	Ailsa Craig	30	132	10.14	410	4,000
1470 x 71	131	Junction Pole No. 795	Junct. Pole No. 1445a	35	125	15.05	651	26,400
1471 x 43	131	" " No. 1445a	Petrolia Dis. Station ..	35	125	6.77	297	"
1443 x 75	132	Petrolia Dist. Station ..	Junct. Pole No. 1962.	40	125	4.89	219	"
1475 x 77	133	Junction Pole No. 1962	" " No. 2304	35	125	7.92	342	"
440 x 11	134	Lucan Dist. Station ..	Granton	30	132	6.09	247	4,000
1477 x 17	135	Junct. Pole No. 2304	Sarnia Mun. Station ..	35	125	7.73	333	26,400
440 x 43	136	Lucan Dis. Station ..	Exeter Dis. Station ..	35	132	13.24	558	13,200
1443 x 14	137	Petrolia Dis. Station ..	Wyoming	25	132	7.92	26	4,000
867 x 68	138	Junction Pole No. 311	Junction Pole No. 802	35	132	11.92	491	26,400
868 x 38	139	" " No. 802	Milverton Dis. Stat..	35	132	.96	38	"
868 x 69	140	" " "	Junct. Pole No. 1314.	35	132	12.83	512	"
869 x 39	141	" " No. 1314	Listowel Dis. Station ..	35	132	2.77	120	"
869 x 70	142	" " "	Junct. Pole No. 1657 .	35	132	8.40	343	"
870 x 72	142	" " No. 1657	" " No. 1687 .	35	132	.78	30	"
872 x 71	142	" " No. 1687	" " No. 1726 .	35	132	.84	39	"
871 x 40	142	" " No. 1726	Palmerston Dis. Stat..	35	132	.42	18	"
871 x 41	143	" " "	Harriston ..	35	132	6.12	260	"
1475 x 74	145	" " No. 1962	Junct. Pole No. 2058 .	35	132	2.35	96	"
1474 x 76	145	" " No. 2058	" " No. 2336.	35	132	6.85	278	"
1476 x 45	145	" " No. 2336	Forest Dis. Station ..	35	132	10.90	444	"
8 x 867	146	Stratford H.T.Stat. .	Junction Pole No. 311	40	120	6.81	311	"
867 x 63	147	Junction Pole No. 311	" " No. 647	40	120	7.61	336	"
863 x 34	148	Junction Pole No. 647	Dublin Dis. Station ..	40	120	5.08	224	"
834 x 65	148	Dublin Dis. Stat....	Junct. Pole No. 1153 .	40	120	6.28	282	"
865 x 66	149	Junct. Pole No. 1153 .	" " No. 1550	40	120	8.84	397	"
866 x 7	150	" " No. 1550	Goderich Mun. Stat..	40	120	13.61	610	"
443 x 74	151	Exeter Dis. Stat....	Junction Pole No. 51.	30	132	1.07	.....	4,000
474 x 14	151	Junction Pole No. 51.	Hensall	30	132	5.12	205	"
1164 x 35	153	" " No. 753	West Lorne Dis. Stat..	30	132	7.62	311	13,200
1135 x 6	154	West Lorne Dis. Stat.	Rodney	30	132	4.00	161	4,000
16 x 1666	155	York H.T. Station...	Junction Pole No. 122	40	125	2.59	122	26,400
1666 x 31	155	Junction Pole No. 122	Etobicoke Dis. Stat..	40	125	.21	10	"
169 x 9	156	" " No. 88.	Niagara Falls Mun. Station ..	35	120	1.08	55	12,000
1476 x 46	157	" " No. 2336	Watford Dis. Station ..	35	132	10.84	443	26,400
834 x 4	158	Dublin Dis. Station ..	Dublin	30	150	1.26	47	4,000
474 x 75	159	Junction Pole No. 51.	Junction Pole No. 316	30	132	7.58	265	"
475 x 16	160	Sarepta Met. Stat 316	Dashwood	30	132	1.35	56	"
475 x 15	161	" " "	Zurich	30	132	5.17	211	"
166 x 69	162	Tap O.P. Line Stanley Street	Junction Pole No. 88.	35	100	1.53	74	12,000
169 x 67	162	Junction Pole No. 88.	" " No. 115	35	100	.53	27	"
167 x 73	162	" " No. 115	" " No. 147	35	100	.52	32	"
173 x 65	162	" " No. 147	" " No. 206	35	100	1.13	59	"
1363 x 3	163	" " No. 30.	Shale Brick Co.	55	120	1.22	59	13,200
171 x 11	164	Junct. Tower No. 330	Dunville Mun. Stat..	35	176	21.54	672	46,000
15 x 1503	165	Essex H.T. Station ..	Canada Salt Co.	40	132	8.10	351	26,400
165 x 5	166	Junction Pole No. 206.	Stamford Twp. Stat..	35	120	.69	34	12,000
165 x 76	167	" " "	Junction Pole No. 52.	35	120	.40	52	"
176 x 16	168	" " No. 52..	Queenston Quarries..	35	120	.41	18	"
176 x 77	169	" " "	Junction Pole No. 72.	35	120	.44	20	"
177 x 17	170	" " No. 72..	Canning Co.	35	120	.08	2	"
177 x 18	171	" " "	St. Davids	35	120	.55	26	"
1471 x 41	172	" " No. 1445a	Oil Springs D.S.	35	132	1.42	63	26,400
1471 x 42	173	" " "	Bridgen. Dis. Station	35	132	8.88	360	"
1168 x 38	174	" " No. 112	Aylmer Dis. Station ..	35	132	9.60	405	13,200

Lines.—Continued

SYSTEM.

No. of Circuits	Power Cable, B.&S.Gauge	Telephone Wire, B.S. & B.W.G. Gauge	Ground Cable	Work Commenced	Work Completed	In Operation
1	2 S.R. Alum.	9 BWG Gal. Iron	1" Gal. Steel	July 1, 1915	Aug. 17, 1915	Aug. 17, 1915
1	2 "	9 "	1"	July 24, "	Oct. 15, "	Oct. 22, "
1	2 "	9 "	1"	July 24, "	Oct. 15, "	Oct. 22, "
1	2 "	"	1"	July 28, "	Dec. 11, "	Dec. 15, "
2	3/0 Alum.	9 BWG Gal. Iron	1"	Aug. 30, "	Feb. 18, 1916	Apl. 6, 1916
2	3/0 "	9 "	1"	Aug. 30, "	Feb. 18, "	Apr. 6, "
2	3/0 "	9 "	1"	Mar 1, 1916	Sep. 12, "	Sep. 29, "
2	3/0 "	9 "	1"	Apl. 6, "	May 27, "	Nov. 10, "
1	6 M.H.D. Copper	"	6 B.W.G. G.Iron	Apl. 6, "	May 27, "	June 29, "
2	3/0 Alum.	9 BWG Gal. Iron	1" Gal. Steel	May 9, "	Nov. 4, "	Nov. 10, "
1	3/0 "	9 "	1"	Nov. 26, 1915	May 4, "	May 4, "
1	6 M.H.D. Copper	"	6 B.W.G. G.Iron	Sept. 1, "	Oct. 4, "	Oct. 4, "
1	1/0 S.R. Alum.	9 BWG Gal. Iron	1" Gal. Steel	Sept. 20, "	May 15, "	May 18, "
1	2 "	9 "	1"	Oct. 15, "	May 18, "	May 18, "
1	1/0 "	9 "	1"	Oct. 13, "	May 22, "	May 27, "
1	2 "	9 "	1"	Oct. 28, "	May 22, "	May 27, "
1	1/0 "	9 "	1"	Oct. 14, "	June 6, "	June 6, "
1	1/0 "	9 "	1"	Oct. 14, "	June 6, "	June 6, "
1	1/0 "	9 "	1"	Oct. 14, "	June 6, "	June 6, "
1	1/0 "	9 "	1"	Oct. 14, "	June 6, "	June 6, "
1	1/0 "	9 "	1"	Dec. 10, "	June 30, "	June 30, "
1	6 BWG Gal. Iron	9 "	6 B.W.G. G.Iron	June 26, "	Dec. 4, "	Feb. 7, 1917
1	6 "	9 "	6 "	June 26, "	Dec. 4, "	Feb. 7, "
1	6 "	9 "	6 "	June 26, "	Dec. 4, "	Feb. 7, "
2	3/0 Alum.	10 B&S C.C. Steel	1" Gal. Steel	Apl. 23, 1913	June 4, 1914	Dec. 23, 1914
2	3/0 "	10 "	1"	Apl. 23, "	June 4, "	Dec. 23, "
2	3/0 "	10 "	1"	Apl. 23, "	June 4, "	Dec. 23, "
2	3/0 "	10 "	1"	Apl. 23, "	June 4, "	Dec. 23, "
2	3/0 "	10 "	1"	Apl. 23, "	June 4, "	Dec. 23, "
2	3/0 "	10 "	1"	Apl. 23, "	June 4, "	Dec. 23, "
1	6 M.H.D. Copper	"	6 B.W.G. G.Iron	Sept. 11, 1916	Dec. 21, 1916	Dec. 21, 1916
1	6 "	"	6 "	Sept. 11, "	Dec. 21, "	Dec. 21, "
1	6 B.W.G. Iron	"	"	Dec. 4, "	Jan. 19, 1917	Dec. 22, "
1	6 M.H.D. Copper	"	6 B.W.G. G.Iron	Jan. 2, 1917	Jan. 17, "	Jan. 15, 1917
2	1/0 Copper	9 BWG Gal. Iron	9/32" Gal. Steel	Feb. 9, "	Sept. 25, 1919	Oct. 10, 1919
2	1/0 "	9 "	9/32" "	Feb. 9, "	Sept. 25, "	Oct. 10, "
2	3 "	9 "	Built by Ont.	Power Co.	"	"
1	6 BWG Gal. Iron	9 "	1" Gal. Steel	June 9, 1917	Aug. 5, 1917	Aug. 10, 1917
1	6 M.H.D. Copper	"	6 B.W.G. G.Iron	June 8, "	July 7, "	Sep. 25, "
1	2 S.R. Alum.	"	1" Gal. Steel	Mar. 21, "	June 13, "	Aug. 23, "
1	6 M.H.D. Copper	"	1" "	Mar. 29, "	June 14, "	Aug. 23, "
1	2 S.R. Alum.	"	1" "	Mar. 29, "	June 18, "	Aug. 23, "
2	345,000 C.M. Alum	12 BWG Gal. Iron	Built by Ont.	Power Co.	"	"
2	173,000 "	12 "	" "	" "	"	"
2	173,000 "	12 "	" "	" "	"	"
1	No. 4 Copper	12 "	" "	" "	"	"
1	2 S.R. Alum.	10 B&S C.C. Steel	1" Gal. Steel	Mar. 6, 1917	Apr. 22, 1917	Apr. 22, 1917
1	5/16" Gal. Steel	9 BWG Gal. Iron	1" "	Aug. 17, "	Mar. 31, 1918	Mar. 21, 1918
2	1/0 Copper	9 "	1"	July 10, "	Oct. 12, 1917	Nov. 9, 1917
1	6 "	"	Built by Ont.	Power Co.	"	"
1	6 "	"	" "	" "	"	"
1	6 "	"	" "	" "	"	"
1	6 "	"	" "	" "	"	"
1	6 "	"	" "	" "	"	"
1	6 BWG Gal. Iron	9 BWG Gal. Iron	1" Gal. Steel	July 20, 1917	Sept. 22, 1917	Dec. 5, 1917
1	6 "	9 "	1"	Aug. 1, "	Sept. 22, "	Dec. 6, "
1	4" Gal. Steel	9 "	1"	Aug. 27, "	Oct. 27, "	Feb. 11, 1918

Description of

NIAGARA

New Section No.	Old Sec. No.	From	To	Aver. Length of Poles	Aver. Span	Miles	No. of Poles	Voltage
N.	L.T.							
1 x 174	175	Niagara H.T. Station	Junct. Tower, No. 118	.....	.....	5.25	.....	46,000
174 x 14	176	Junct. Tower No. 118	St. Catharines M.S...	.....	.....	.....	.....	.....
439 x 9	177	Dorchester D.S.	Dorchester	30	160	2.81	91	4,000
840 x 73	178	Palmerston D.S.	Junction Pole No. 263	30	150	7.09	237	“
873 x 13	178	Junction Pole No. 263	Drayton	30	150	3.54	123	“
21 x 22	179	Erindale PowerHouse	Cooksville H.T. Stat.	35	132	3.11	128	13,200
873 x 12	180	Junction Pole No. 263	Moorefield	30	150	1.36	52	4,000
1367 x 70	181	“ No. 27.	Junction Pole No. 52.	25	120	.51	25	“
1370 x 7	181	“ No. 52.	Toronto Milling Co...	25	120	.72	33	“
1274 x 14	184	“ No. 714	Wolverton Mills	35	132	1.81	1	“
15 x 1564	185	Essex H.T. Station ..	Junction Pole No. 231	.....	.....	5.30	.....	26,400
1537 x 38	186	Kingsville D.S.	Leamington D.S....	35	160	8.40	295	4,000
1570 x 39	187	Junction Pole No. 1605	Cottam Dis. Station ..	35	160	.80	22	26,400
1564 x 34	188	“ No. 231	Canard River D.S....	35	160	6.00	190	“
1534 x 65	189	Canard River D.S....	Junction Pole No. 642	35	160	7.25	220	“
1565 x 35	190	Junction Pole No. 642	Amherstburg D.S....	35	160	2.30	78	“
1565 x 36	191	“ No. 642	Harrow Dis. Station ..	35	160	12.75	401	“
1536 x 67	192	Harrow Dis. Station..	Junct. Pole No. 1374.	35	160	9.70	334	“
1567 x 37	193	Junct. Pole No. 1374.	Kingsville D.S.....	35	160	.50	7	“
1567 x 68	194	“ “ “	Junct. Pole No. 1381.	35	160	.21	7	“
1568 x 69	194	“ No. 1381	“ No. 1412	35	160	.49	31	“
1569 x 38	195	“ No. 1412	Leamington Dis. Stat.	35	160	7.50	289	“
1569 x 70	196	“ “ “	Junct. Pole No. 1605.	35	160	5.20	192	“
1570 x 40	197	“ No. 1505	Essex Dis. Station...	35	160	4.70	157	“
167 x 7	198	Junction Pole	Nat. Abrasive Co. ....	.....	.....	.....	.....	.....
199	199	Etobicoke Entrance	Structure .....	.....	.....	.....	.....	.....
1009 x 10	200	Tillsonburg	Sec. 1 Twp. of Dere-					
			ham	30	160	.72	25	4,000
1009 x 10	201	Sec. 2 in the Town	ship of Dereham	30	160	.96	32	“
1009 x 10	202	Sec. 3 in the Town	ship of Dereham	30	160	6.50	215	“
1009 x 10	203	Sec. 6 in the Town	ship of Dereham	45	160	.40	14	“
1009 x 10	204	Sec. 7 in the Town	ship of Dereham	35	160	.34	12	“
1009 x 10	205	Sec. 9 in Township	S. Dorchester-Spring- field	30	160	3.62	120	“
	206	Tor. Milling Co.	Milton Pressed Brick	.....	.....	.....	1	2,200
118 x 6	207	St. David's	Niagara-on-the-Lake	30	125	7.83	334	12,000
202 x 11	209	Dundas Mun. Station	Copetown	35	132	5.98	5	2,200
472 x 42	210	Junction Pole No. 757	Ailsa Craig D.S.	30	132	6.34	403	13,200
442 x 18	211	Ailsa Craig D.S.	Parkhill	30	160	9.03	325	4,000
1438 x 19	212	Bothwell Dist. Stat. .	Newbury	30	160	5.93	210	“
1419 x 20	213	Newbury	Glencoe	30	160	5.89	199	“
1370 x 11	214	Junction Pole No. 52.	W. D. Reid & Sons,					
			Streetsville	30	132	.22	9	“
	215	Malvern	Markham	40	125	5.58	235	“
1631 x 66	216	Etobicoke Station ...	Junction Pole No. 122 .....	.....	.....	.22	.....	2,200

RIDEAU

R.	R.L.							
1 x 2	1	High Falls Gen. Stat.	Perth Trans. Station	35	132	21.03	869	26,400
2 x 55	2	Perth Trans. Station	Junct. Pole No. 1328.	35	132	11.31	459	“
55 x 3	2	Junct. Pole No. 1328.	Smith's Falls Station	35	132	5.64	233	“
3 x 4	3	Smith's Falls Station	Merrickville	35	132	12.30	517	“
55 x 5	4	Junction Pole No. 1328	Carleton Place	30	150	14.24	523	“

Lines.—Continued

SYSTEM

No. of Circuits	Power Cable, B.&S. Gauge	Telephone Wire, B. & S. & B.W.G. Gauge	Ground Cable	Work Commenced	Work Completed	In Operation
2	7/16" Gal. Steel.	.....	.....	Nov. 13, 1917	Dec. 11, 1917	.....
1	4 Copper	.....	1/2" Gal. Steel	.....	.....	.....
1	4 "	.....	6 B.W.G. Iron	Oct. 24, 1917	Jan. 16, 1918	Feb. 22, 1918
1	4 "	.....	6	Oct. 24, " "	Jan. 16, "	Feb. 22, "
1	4 M.H.D. Copper	9 BWG Gal. Iron	9/32" Gal. Steel	Oct. 27, "	Nov. 22, 1917	Dec. 14, 1917
1	6 Copper	.....	6 B.W.G. Iron	Dec. 1, 1917	Dec. 20, "	Feb. 22, 1918
1	6 "	.....	6	Feb. 2, 1918	Mar. 18, 1918	Mar. 9, "
1	6 "	.....	6	Feb. 2, "	Mar. 18, "	Mar. 9, "
1	6 M.H.D. Copper	.....	.....	Sept. 18, 1918	Oct. 22, "	Oct. 22, "
1	2 Bare Std. Copp.	.....	.....	Sept. 24, "	Oct. 21, "	Feb. 1, 1919
1	3/0 Alum.	.....	.....	Built by Essex Power & Light Co.	.....	.....
1	1/0 "	.....	.....	"	"	"
1	1/0 "	.....	.....	"	"	"
1	1/0 "	.....	.....	"	"	"
2	1/0 "	.....	.....	"	"	"
1	1/0 "	.....	.....	"	"	"
1	1/0 "	.....	.....	"	"	"
2	1/0 "	.....	.....	"	"	"
1	1/0 "	.....	.....	"	"	"
1	1/0 "	.....	.....	"	"	"
1	1/0 "	.....	.....	"	"	"
1	1/0 "	.....	.....	"	"	"
1	1/0 "	.....	.....	"	"	"
1	1/0 "	.....	.....	"	"	"
1	4 Copper	.....	1/2" Gal. Steel	Nov. 23, 1916	.....	July 1, 1917
1	4 "	.....	1/2" "	Nov. 23, "	.....	July 1, "
1	6 "	.....	1/2" "	Nov. 23, "	.....	July 1, "
1	6 "	.....	1/2" "	Nov. 23, "	.....	July 1, "
1	6 "	.....	1/2" "	Nov. 23, "	.....	July 1, "
1	6 "	.....	5/16" "	Nov. 23, "	.....	July 1, "
1	6 "	.....	.....	Mar. 20, 1919	Apr. 11, 1919	Mar. 20, "
1	6 "	.....	.....	.....	.....	.....
1	6 H.D. Copper	9 BWG Gal. Iron	.....	Sept. 10, 1919	Oct. 4, 1919	Oct. 17, 1919
1	2 S.R. Alum.	6 S.R. Alum.	9/32" Gal. Steel	Nov. 12, "	June 1, 1920	May 2, 1920
1	2 "	.....	1/2" "	Nov. 17, "	May 21, "	May 4, "
1	2 "	.....	9/32" "	Dec. 27, "	.....	.....
1	2 "	.....	9/32" "	Feb. 2, 1920	.....	.....
1	6 Copper	.....	1"	Dec. 22, 1919	Jan. 14, 1920	Jan. 14, 1920
1	2 S.R. Alum.	.....	1"	Dec. 27 "	.....	Apr. 1, 1920
1	2/0 Copper	.....	1"	.....	.....	.....

SYSTEM

1	125,000 C.M. Alum	9 BWG Gal. Iron	9/32" Gal. Steel	Aug. 22, 1918	Apr. 25, 1919	June 23, 1919
1	125,000 "	9 "	9/32" "	Apr. 12, "	Dec. 9, 1918	Feb. 18, "
1	125,000 "	9 "	9/32" "	Apr. 12, "	Dec. 9, "	Feb. 18, "
1	5/16" Gal. Steel	9 "	1"	Nov. 27, 1917	June 12, "	Sep. 5, 1918
1	125,000 C.M. Alum	9 "	9/32" "	May 7, 1919	Nov. 20, 1919	May 31, 1920

Description of
MUSKOKA

New Section No.	Old Sec. No.	From	To	Aver. Length of Poles	Aver. Span	Miles	No. of Poles	Voltage
M. 1 x 2	M.L. 1	South Falls Gen. Stat.	Huntsville Dis. Stat..	feet 35	feet 132	26.32	1,141	22,000

NIPISSING

Z. 1 x 101	....	Nipissing Pwr. House	Nipissing Village	28	126	2.50	128	2,200
1 x 52	....	" "	Powassan Tap.....	34	126	3.00	137	22,000
52 x 2	....	Powassan Tap.....	Powassan.....	32	126	4.00	184	"
52 x 3	....	" " .....	Callander.....	34	126	7.00	318	"
3 x 4	....	Calander.....	North Bay	35	126	8.20	401	"

EUGENIA FALLS

E.	EFL							
1 x 52	1	Eugenia Gen. Station	Junction Pole No. 316	40	125	7.28	316	22,000
52 x 3	1	Junction Pole No. 316	Chatsworth Dis. Stat.	40	125	15.27	658	"
3 x 65	2	Chatsworth Dis. Stat.	Junct. Pole No. 1141a	40	125	3.92	168	"
65 x 2	2	Junct. Pole No. 1141a	Owen Sound Dis.Stat.	40	125	5.28	227	"
1 x 55	3	Eugenia Gen. Station	Junction Pole No. 297	40	125	6.78	297	"
55 x 58	4	Junction Pole No. 297	" " No. 964	40	125	15.68	666	"
58 x 57	4	" " No. 964	" " No. 971	40	125	.12	7	"
57 x 7	4	" " No. 971	Durham District Stat.	40	125	.17	14	"
57 x 56	5	" " "	Junct. Pole No. 1015 .	40	125	1.05	44	"
56 x 59	5	" " No. 1015	Junct. Pole No. 1326 .	40	125	7.21	311	"
59 x 9	5	" " No. 1326	Mount Forest Dis. Station	40	125	7.49	336	"
63 x 13	6	" " No. 1798	Grand Valley D.S....	35	132	8.98	384	"
58 x 54	7	" " No. 964	Junct. Pole No. 1491	40	125	12.11	527	"
54 x 17	8	" " No. 1491	Elmwood Dis. Station	40	125	4.99	214	"
17 x 4	8	Elmwood Dis. Station	Chesley	40	125	6.07	259	"
55 x 5	9	Junction Pole No. 297	Dundalk	40	125	11.44	499	"
5 x 10	10	Dundalk Dis. Station	Shelburne	40	125	13.12	565	"
54 x 8	11	Junct. Pole No. 1491.	Hanover	40	125	.76	33	"
1 x 101	12	Eugenia Gen. Station	Markdale.....		125	7.28	.....	4,000
1 x 102	13	" "	Flesherton.....		125	6.78	.....	"
7 x 702	14	Durham Dis. Station	Holstein	30	130	2.63	96	"
65 x 15	15	Junct. Pole No. 1141a	Kilsyth Dis. Station	40	125	4.80	206	22,000
15 x 1501	16	Kilsyth Dis. Station..	Tara	40	125	6.80	291	4,000
10 x 60	17	Shelburne D.S.....	Junct. Pole No. 1380.	30	130	.49	19	22,000
60 x 63	17	Junct. Pole No. 1380.	" " No. 1798	30	130	10.20	418	"
63 x 62	17	" " No. 1798	" " No. 1996	30	130	4.50	198	"
62 x 12	17	" " No. 1996	Orangeville Dis. Stat.	30	130	.21	13	"
10 x 1002	18	Shelburne Dis. Stat..	Horning's Mills.....	30	130	5.53	234	4,000
1 x 64	19	Eugenia Gen. Station	Junction Pole No. 187	35	125	4.04	187	22,000
64 x 11	20	Junction Pole No. 187	Collingwood D.S.	35	125	20.17	883	"
12 x 1201	21	Orangeville D.S.	Alton Foundry.....	30	132	5.75	249	4,000
13 x 1302	22	Grand Valley D.S....	Arthur	30	120	12.36	531	"
8 x 863	26	Hanover Dis. Station..	Junction Pole No. 117	30	132	2.73	117	"
863 x 3	27	Junction Pole No. 117	Carlsruhe	30	132	1.61	57	"
863 x 2	28	" "	Neustadt	30	132	2.31	97	"
8 x 70	....	Hanover Dis. Station	Walkerton Junc. Pole	40	132	7.25	296	40,000
70 x 71	....	Walkerton Junc. Pole	Teeswater	40	132	8.75	349	"
71 x 21	....	Teeswater Junc. Pole	" Dis. Stat.	35	132	7.15	281	"
71 x 74	....	" "	Kinloss Junction Pole	35	132	5.75	220	"
74 x 25	....	Kinloss Junction Pole	Kincardine Dis. Stat.	35	132	12.75	517	"
74 x 24	....	" "	Holyrood	35	132	5.50	223	"
21 x 72	....	Teeswater Dis. Stat.	Wingham Junct. Pole	35	132	8.50	302	"
72 x 22	....	Wingham Junct. Pole	Wingham Dis. Stat...	35	132	4.75	170	"
24 x 2402	....	Holyrood Dis. Station	Lucknow	30	150	4.70	183	4,000
24 x 2403	....	" "	Ripley	30	150	6.13	239	"

Lines.—Continued

SYSTEM

No. of Circuits	Power Cables B. & S. Gauge	Telephone Wire, B. & S. & B.W.G. Gauge	Ground Cable	Work Commenced	Work Completed	In Operation
1	2 S.R. Alum.	9 BWG Gal. Iron	1/4" Gal. Steel..	Aug. 6, 1915	Apr. 29, 1916	Aug. 15, 1916

SYSTEM

1	No. 6 W.P. Copp.	.....	.....	.....	1911	1911	1911
1	No. 2 Alum.	9 BWG Gal. Iron	5/16" Gal. Steel	Aug. 1909	Mar. 1910	Mar. 1910	Mar. 1910
1	No. 2 ..	9	5/16" ..	Nov. 1911	Dec. 1911	Dec. 1911	Dec. 1911
1	No. 2 ..	9	5/16" ..	Aug. 1909	Mar. 1910	Mar. 1910	Mar. 1910
1	No. 2 ..	9	5/16" ..	Aug. ..	Mar. 1910	Mar. 1910	Mar. 1910

SYSTEM

2	3/0 Alum.	9 BWG Gal. Iron	1/4" Gal. Steel..	Mar. 17, 1915	July 7, 1915	Nov. 18, 1915	Nov. 18, ..
2	3/0 ..	9	1/4" ..	Mar. 17, ..	July 7, ..	Nov. 18, ..	Nov. 18, ..
2	3/0 ..	9	1/4" ..	Apr. 7, ..	Sept. 24, ..	Nov. 18, ..	Nov. 18, ..
2	3/0 ..	9	1/4" ..	Apr. 7, ..	Sept. 24, ..	Nov. 18, ..	Nov. 18, ..
2	3/0 ..	9	1/4" ..	Apr. 10, ..	July 21, ..	Nov. 18, ..	Nov. 18, ..
2	3/0 ..	6 B&S S.R.Alum	1/4" ..	Apr. 13, ..	July 11, ..	Nov. 18, ..	Nov. 18, ..
2	3/0 ..	6	1/4" ..	Apr. 13, ..	July 11, ..	Nov. 18, ..	Nov. 18, ..
2	3/0 ..	6	1/4" ..	Apr. 13, ..	July 11, ..	Nov. 18, ..	Nov. 18, ..
2	1-3/0 ..	9 BWG Gal. Iron	1/4" ..	Apr. 26, ..	Aug. 25, ..	Nov. 18, ..	Nov. 18, ..
2	1-5/16" Steel	.....	.....	.....	.....	.....	.....
2	1-3/0" Alum.	9	1/4" ..	Apr. 26, ..	Aug. 25, ..	Nov. 18, ..	Nov. 18, ..
2	1-5/16" Steel	.....	.....	.....	.....	.....	.....
2	1-3/0" Alum.	9	1/4" ..	Apr. 26, ..	Aug. 25, ..	Nov. 18, ..	Nov. 18, ..
2	1-5/16" Steel	.....	.....	.....	.....	.....	.....
1	6 M.H.D. Copper	9	1/4" ..	July 21, 1916	Dec. 1, 1916	Dec. 1, 1916	Dec. 1, 1916
2	3/0 S.R.Alum.	6 B&S S.R.Alum	1/4" ..	Oct. 19, 1915	Aug. 19, ..	June 18, ..	June 18, ..
2	3/0 Alum.	6 B&S S.R.Alum	1/4" ..	Oct. 19, 1915	Aug. 19, ..	June 18, ..	June 18, ..
1	3/0 ..	9 BWG Gal. Iron	1/4" ..	Dec. 4, ..	June 10, ..	June 18, ..	June 18, ..
1	3/0 ..	9	1/4" ..	Dec. 4, ..	June 10, ..	June 18, ..	June 18, ..
1	1/0 ..	9	1/4" ..	May 20, ..	Aug. 14, 1915	Nov. 18, 1915	Nov. 18, 1915
1	1/0 ..	9	1/4" ..	June 9, ..	Aug. 24, ..	Nov. 18, ..	Nov. 18, ..
3	1-1/0 S.R.Alum.	6 B&S S.R.Alum	1/4" ..	Aug. 18, 1916	Sept. 16, 1916	Sep. 16, 1916	Sep. 16, 1916
1	2-3/0 ..	6 B&S S.R.Alum	1/4" ..	Dec. 28, 1915	Jan. 17, ..	Feb. 8, ..	Feb. 8, ..
1	2 ..	.....	.....	.....	.....	.....	.....
1	2 ..	.....	.....	.....	.....	.....	.....
1	2 ..	.....	.....	.....	.....	.....	.....
1	6 BWG Gal. Iron	9 BWG Gal. Iron	1/4" Gal. Steel	Dec. 10, 1915	Apr. 3, 1916	Apr. 3, 1916	Apr. 3, 1916
1	6 M.H.D. Copper	9	1/4" ..	Nov. 7, 1916	Jan. 31, 1917	Jan. 1, 1918	Jan. 1, 1918
1	6 Copper	10	1/4" ..	Oct. 12, ..	Jan. 19, ..	Jan. 1, ..	Jan. 1, ..
1	6 ..	10	1/4" ..	Built by	Pine River	Develop. Co.	Develop. Co.
1	6 ..	10	1/4" ..	Built by	Pine River	Develop. Co.	Develop. Co.
1	6 ..	10	1/4" ..	Built by	Pine River	Develop. Co.	Develop. Co.
1	6 ..	10	1/4" ..	Built by	Pine River	Develop. Co.	Develop. Co.
1	6 M.H.D. Copper	.....	10 BWG G. Iron	Built by	Pine River	Develop. Co.	Develop. Co.
1	1/0 Copper	9 BWG Gal. Iron	1/4" Gal. Steel	Aug. 21, 1916	Oct. 5, 1916	Oct. 6, 1916	Oct. 6, 1916
1	1/0 ..	9	1/4" ..	Aug. 14, ..	Oct. 5, ..	Oct. 6, ..	Oct. 6, ..
1	4 M.H.D. Copper	.....	6 BWG G. Iron	Oct. 17, ..	Nov. 22, ..	Nov. 27, ..	Nov. 27, ..
1	4 ..	.....	6	Oct. 30, ..	Feb. 19, 1917	Feb. 19, 1917	Feb. 19, 1917
1	6 .. ..	.....	6	Nov. 1, 1917	Dec. 12, ..	Dec. 12, ..	Dec. 12, ..
1	6 .. ..	.....	6	Sept. 26, 1918	Dec. 2, 1918	Nov. 17, 1918	Nov. 17, 1918
1	6 DBWP Copper	.....	6	Oct. 10, 1918	Dec. 11, ..	Nov. 17, ..	Nov. 17, ..
1	1/0 S.R. Alum.	6 S.R. Alum.	5/16" Gal. Steel	May 22, 1920	Aug. 5, 1920	Dec. 19, 1920	Dec. 19, 1920
1	1/0 ..	6	5/16" ..	June 8, ..	Aug. 20, ..	Dec. 19, ..	Dec. 19, ..
1	1/0 ..	6	5/16" ..	May 27, ..	Sept. 3, ..	Dec. 19, ..	Dec. 19, ..
1	1/0 ..	6	5/16" ..	July 30, ..	Sept. 17, ..	.....	.....
1	1/0 ..	6	5/16" ..	Aug. 11, ..	Oct. 18, ..	.....	.....
1	5/16" Gal. Steel	9 BWG Gal. Iron	5/16" ..	Sept. 3, ..	Dec. 17, ..	.....	.....
1	1/0 S.R. Alum.	6 S.R. Alum.	5/16" ..	July 9, ..	Nov. 19, ..	Dec. 21, 1920	Dec. 21, 1920
1	1/0 ..	6	5/16" ..	Oct. 14, ..	Dec. 17, ..	Dec. 21, ..	Dec. 21, ..
1	2 ..	.....	1/4" ..	Sept. 22, ..	Dec. 17, ..	.....	.....
1	2 ..	.....	1/4" ..	Nov. 5, ..	Dec. 17, ..	.....	.....

Description of
WASDELL'S

New Sec. No.	Old Sec. No.	From	To	Aver. Length of Pole	Aver. Span	Miles.	No. of Poles	Voltage
W.	W.L.	Wasdell's Falls Gen.		feet	feet			
1 x 54	{ 1 & 1a	Station	Junction Pole No. 183	40	120	3.94	183	22,000
54 x 51	1	Junction Pole No. 183	" " No. 832	40	120	14.34	649	"
51 x 56	1	" " No. 832	" " No. 1011	40	120	3.93	178	"
56 x 52	1	" " No. 1011	" " No. 1203	40	120	4.32	193	"
52 x 2	2	" " No. 1203	Beaverton Dis. Stat..	40	120	1.49	70	"
52 x 57	3	" " "	Junct. Pole No. 1408.	40	120	4.47	205	"
57 x 53	3	" " No. 1408	" " No. 1559	40	120	3.34	151	"
53 x 3	3	" " No. 1559	Cannington Dis. Stat.	40	120	1.86	86	"
2 x 202	4	Beaverton Dis. Stat..	Gamebridge			5.81		4,000
202 x 3	5	Gamebridge	Brechin			3.93		"
3 x 302	6	Cannington Station .	Woodville	30	120	5.15	148	"
3 x 303	7	" "	Sunderland	30	120	7.40	335	"
54 x 4	8	Junction Pole No. 183	Severn Sys., Longford	35	132	6.41	267	22,000
56 x 6	....	" " No. 1011	Kirkfield Dis. Station	35	150	11.34	412	"
6 x 602	....	Kirkfield Dis. Station	Kirkfield			1.01		4,000

SEVERN

S.	S.L.							
8 x 56	1	Waubaushene Sw.Sta	Junction Pole No. 193	40	120	3.68	163	22,000
56 x 6	2	Junction Pole No. 193	Coldwater Dis Stat..	40	120	1.16	55	"
56 x 57	3	" " "	Junction Pole No. 903	40	120	15.86	711	22,000
57 x 7	4	" " No. 903	Elmvale Dis. Station	40	120	.42	19	"
57 x 54	5	" " "	Junct. Pole No. 1110	40	120	4.57	207	"
54 x 72	6	" " No. 1110	" " No. 1590	40	120	10.76	480	"
54 x 60	7	" " "	" " No. 1786	40	120	15.07	676	"
60 x 10	8	" " No. 1786	Stayner Dis. Station.	40	120	1.50	69	"
60 x 5	9	" " "	Collingwood D.S.	40	120	12.04	525	"
10 x 1002	10	Stayner Dis. Station.	Creemore	35	120	7.68	347	4,000
20 x 8	11	Big Chute Gen. Stat.	Waubaushene Tr.Xing	35	120	11.39	{ 504 496 } 22,000	
		Waubaushene Tr.Xing	" Sw. Stat.	40	120	.61	31	"
8 x 69	12	" Sw.Stat.	Junction Pole No. 188	40	100	3.59	188	"
69 x 19	13	Junction Pole No. 188	Victoria Harbor D.S.	40	120	1.52	82	"
69 x 71	14	" " "	Junction Pole No. 401	40	100	4.03	213	"
67 x 1	16	" " "	Midland Dis. Station.	40	100	5.30	272	"
1 x 2	17	Midland Dis. Station	Penetang ..	40	120	3.03	143	"
	18	Waubaushene	Waubaushene D.S. ...			50ft.	....	"
71 x 67	19	Junction Pole No. 401	Junction Pole No. 431	35	100	.56	30	"
71 x 21	20	" " "	C.P.R. Elevators D.S.	35	125	1.33	58	"
72 x 22	21	" " No. 1590	CampBorden Dis. Sta.	35	132	14.76	604	"
72 x 4	22	" " "	Barrie Dis. Station ..	40	120	1.57	64	"
20 x 9	23	Big Chute Gen. Stat..	SwiftRapids Gen.Sta.	30	120	7.50	328	"
4 x 61	24	Barrie Dis. Station ..	Junct. Pole No. 1834.	40	125	3.88	180	"
61 x 86	25	Junct. Pole No. 1834.	" " No. 2021	40	125	4.28	187	"
86 x 87	26	" " No. 2021.	" " No. 2282	40	125	5.99	261	"
87 x 35	27	" " No. 2282.	Cookstown Dis. Stat.	40	125	2.24	98	"
35 x 84	28	Cookstown D.S.	Junct. Pole No. 2701.	40	125	7.35	321	"
84 x 32	29	Junct. Pole No. 2701.	Alliston Dis. Station	40	125	1.82	86	"
84 x 83	30	" " "	Junct. Pole No. 2984.	40	125	6.30	283	"

Lines—Continued

SYSTEM

No. of Circuits	Power Cable B. & S. Gauge	Telephone Wire, B. & S. & B. W.G. Gauge	Ground Cable	Work Commenced	Work Completed	In Operation
2 {	1/0 Alum. 1/0 S.R.Alum. }	10 B&S C.C.Steel	1/4" Gal. Steel	Jan. 17, 1914	Sept. 28, 1914	Sep. 28, 1914
1	1/0 "	10 " "	1/4" "	Jan. 17, "	Sept. 28, "	Sep. 28, "
1	1/0 "	10 " "	1/4" "	Jan. 17, "	Sept. 28, "	Sep. 28, "
1	1/0 "	10 " "	1/4" "	Jan. 17, "	Sept. 28, "	Sep. 28, "
1	1/4" Gal. Steel	10 " "	1/4" "	Mar. 30, "	Sept. 28, "	Sep. 28, "
1	2 S.R. Alum.	10 " "	1/4" "	Feb. 18, "	Sept. 28, "	Sep. 28, "
1	1/4" Gal. Steel	10 " "	1/4" "	Feb. 18, "	Sept. 28, "	Sep. 28, "
1	1/4" "	10 " "	1/4" "	Feb. 18, "	Sept. 28, "	Sep. 28, "
1	1/0 Alum.	.....	.....	May 2, "	.....	Oct. 6 "
1	1/0 "	.....	.....	July 25, "	.....	Oct. 6 "
1	1/0. "	.....	1/4" Gal. Steel	May 19, "	.....	Oct. 19 "
1	1/0 "	.....	1/4" "	June 1, "	July 10, 1914	Oct. 19 "
1	1/0 "	9 BWG Gal. Iron	1/4" "	Feb. 17, 1916	May. 27, 1916	June 4, 1916
1	2 S.R. Alum.	6 S.R. Alum.	9/32" "	Feb. 10, 1920	Apr. 21, 1920	Apr. 22, 1920
1	2 "	.....	.....	.....	.....	.....

SYSTEM

2	4/0 Alum.	{ 9 BWG Gal. Iron 10 B&S C.C.Steel	{ 1/4" Gal. Steel	Sep. 20, 1912	Feb. 18, 1913	Feb. 24, 1913
1	2 "	10 " "	1/4" "	Sep. 20, "	Feb. 18 "	Feb. 24, "
2	4/0 "	{ 9 BWG Gal. Iron 10 B&S C.C.Steel	{ 1/4" "	Sep. 25, "	Feb. 18, "	Feb. 24, "
1	2 "	10 " "	1/4" "	Feb 1, 1913	May 17, 1913	May 27, "
2	4/0 "	{ 9 BWG Gal. Iron 10 B&S C.C.Steel	{ 1/4" "	Oct. 20, 1912	Feb. 18, "	Feb. 24, "
2	2/0 "	10 " "	1/4" "	Nov. 6, 1912	April 5 "	Apr. 6, "
2	3/0 "	10 " "	1/4" "	Oct. 23, 1912	Feb. 18, "	Feb. 24, "
1	2 "	10 " "	1/4" "	Jan. 24, 1913	Apr. 26, "	Feb. 25, "
2	3/0 "	10 " "	1/4" "	Nov. 1, 1912	Feb. 18, "	Feb. 24, "
1	1/0 "	.....	1/4" "	Aug. 15, 1914	Oct. 25, 1914	Oct. 21, 1914
2 {	4/0 "	9 BWG Gal. Iron	1/4" "	.....	.....	1915
2	2/0 "	12 " "	1/4" "	.....	.....	.....
2 {	4/0 "	9 " "	1/4" "	.....	.....	1915
2	2/0 "	10 B&S C.C.Steel	1/4" "	.....	.....	.....
2 {	1/0 "	10 B&S C.C.Steel	.....	Apr. 1, 1916	May 5, 1916	July 24, 1916
1	2 "	12 BWG Gal. Iron	1/4" Gal. Steel	.....	.....	.....
2 {	2/0 "	12 " "	.....	.....	.....	.....
2 {	1/0 S.R.Alum.	.....	.....	Mar. 7, 1916	May 5, 1916	July 24, 1916
2 {	2/0 Alum.	12 " "	.....	.....	.....	.....
2 {	1/0 S.R.Alum.	12 " "	.....	.....	.....	May 22, 1917
2	2 Std. Copper	10 B&S C.C.Steel	1/4" Gal. Steel	June 7, 1911	July 18, 1911	July 18, 1911
1	2 Alum.	.....	.....	.....	.....	Oct. 15, 1915
2 {	2/0 "	12 BWG Gal. Iron	.....	.....	.....	.....
2 {	1/0 S.R.Alum.	.....	.....	.....	.....	.....
2	1/0 Alum.	9 " "	1/4" Gal. Steel	Feb. 29, 1916	Apr. 14, 1916	July 24, 1916
1	6 M.H.D. Copper	9 " "	6 BWG G.Iron	May 30, "	July 11, "	June 29, "
2	2/0 Alum.	10 B&S C.C.Steel	1/4" Gal. Steel	Nov. 6, 1912	Apr. 5, 1913	April 6, 1913
1	2 "	10 B&S Copper	5/16"	.....	.....	.....
1	125,000 C.M. A1	9 BWG Gal. Iron	1/4" "	Sept. 13, 1917	Feb. 9, 1918	Apr. 25, 1918
1	125,000 "	9 " "	1/4" "	Oct. 6 "	Feb. 19, "	Apr. 25, "
1	125,000 "	9 " "	1/4" "	Oct. 20, "	Mar. 4, "	Apr. 25, "
1	125,000 "	9 " "	1/4" "	Nov. 8, "	Mar. 9, "	Apr. 25, "
1	125,000 "	9 " "	1/4" "	Nov. 16, "	Mar. 23, "	May 23, "
1	125,000 "	9 " "	9/32" "	Dec. 8, "	Apr. 17, "	May 23, "
1	5/16" Gal. Steel	9 " "	9/32" "	Jan. 2, 1918	May. 14, "	July 26, "

Description of
SEVERN

New Sec. No.	Old Sec. No.	From	To	Aver. Length of Pole	Aver. Span.	Miles	No. of Poles	Voltage
S.	S.L.							
83 x 34	31	Junction Pole No. 2984	Tottenham D.S.	40	125	3.61	177	22,000
83 x 33	32	" " "	Beeton Dis. Station ..	40	125	1.76	84	"
87 x 62	33	" " " No. 2282	Junct. Pole No. 2451 .	40	125	3.87	169	"
62 x 37	34	" " " No. 2451	Bradford Dis. Station	40	125	7.25	319	"
86 x 36	35	" " " No. 2021	Thornton "	40	125	1.85	81	"

THUNDER BAY

P.								
1 x 2	....	Nipigon Gen. Station	Pt.Arthur Trans. Sta.	.....	.....	5.11	.....	.....
5 x 2	....	Kaminist. Power Co.	" "	.....	.....	4.00	.....	22,000
54 x 2	....	Port Arthur Easterly Limits.....	" "	.....	.....	.35	.....	110,000
1 x 51	....	Nipigon Gen. Station	Everard	45	330	19.23	313	"
51 x 52	....	Everard	Pearl	45	330	22.22	356	"
52 x 53	....	Pearl	Intersection C. N. Ry.	45	330	9.05	147	"
53 x 54	....	Intersection C.N.Ry..	Port Arthur E. Limits	45	330	18.51	301	"
2 x 261	....	Pt.Arthur Trans. Sta.	Lyon Av. & Duluth Rd.	.....	.....	.....	.....	.....
261 x 31	....	Lyon Av. & Duluth Rd	Port Arthur Dis. Stat.	.....	.....	.....	.....	.....
56 x 50	....	Nipigon Pulp & Paper Co.	Sprucewood Jet. Pole	45	325	6.25	.....	110,000

ST. LAWRENCE

L.	St.L							
53 x 52	1a	Junction Pole No. 1..	Junct. Pole No. 363½	40	120	7.63	363	26,400
52 x 2	1a	Irq. Trans. Station	Prescott Dis. Stat. ..	40	120	15.33	721	"
54 x 53	2 & 8	Junc. t.Pole No. 363½	Junct. Pole No. 1 (Morrisburg) ..	40	120	1.96	94	"
54 x 57	2	" " "	Junction Pole No. 298	40	120	4.61	204	"
57 x 4	2	" " " No. 298	Winchester Dis. Stat.	40	120	9.78	449	"
4 x 5	3	Winchester Dis. Stat.	Chesterville "	40	120	6.71	303	"
2 x 3	5	Prescott Dis. Station	Brockville "	40	120	14.08	630	"
7 x 701	6	Morrisburg Met. Stat.	Williamsburg .....	.....	.....	6.57	.....	4,000
1 x 51	8	Cornwall Power Stat.	Switch Pole No. 391..	40	176	12.63	391	46,000
51 x 54	8	Switch Pole No. 391.	Junction Pole No. 94	40	176	12.76	340	"
1 x 6	12	Cornwall Power Stat.	Toronto Paper Co. Ld.	40	176	2.57	88	"
13	13	Brockville Dis. Stat..	St. Mary's College ..	30	160	2.48	.92	2,300
1 x 66	....	Cornwall Power Stat.	Grant Corners, Junct. Pole No. 143	45	325	8.06	143	44,000
66 x 13	....	Grant Corners,	Martintown Dis. Sta..	45	325	4.79	80	"
13 x 14	....	Junct. Pole No. 143	Apple Hill Junct. Pole	45	325	5.16	87	"
14 x 67	....	Apple Hill Junct. Pole	Dominionville Junct. Pole No. 348	45	325	2.18	38	"
67 x 15	....	Dom. Jet. Pole No. 348	Alexandria. Dis. Stat.	45	325	8.80	161	"
67 x 17	....	" " "	Maxville Dis. Stat..	45	325	5.16	94	"

CENTRAL ONTARIO

C.								
43 x 4302	C.O.S. 1607	Napanee	Newburg	30	132	7.91	.....	4,000
14 x 64								
64 x 53	C.O.L. 49	Healey Falls..	Trenton	40	176	30.53	975	44,000
53 x 3								
43 x 44	C.O.L. 50	Napanee	Kingston	40	175	26.50	863	"
96 x 45	C.O.L. 51	Trenton	Wellington	40	176	17.62	565	"
45 x 46	C.O.L. 52	Wellington ..	Picton	40	176	10.80	345	"
14 x 31	....	Healey Falls..	Norwood	40 & 45	300	10.44	174	"
31 x 19	....	Norwood	Peterborough	40 & 45	300	17.89	301	"
14 x 1401	....	Healey Falls..	Ont. Rock Co.	30	150	6.01	222	6,600
18 x 1832	....	Auburn Stat. ..	Lakefield	30	150	7.92	290	"

Lines—Continued

SYSTEM

No. of Circuits	Power Cable B. & S. Gauge	Telephone Wire, B. & S. & B. W. G. Gauge	Ground Cable	Work Commenced	Work Completed	In Operation
1	5/16" Gal. Steel	9-BWG Gal. Iron	9/32" Gal. Steel	Jan. 30, 1918	May 22, 1918	Sep. 9, 1918
1	5/16" "	9 " " "	9/32" "	Feb. 28, "	May 28, "	July 26, "
1	5/16" "	9 " " "	9/32" "	May 29, "	July 3, "	Sep. 16, "
1	5/16" "	9 " " "	9/32" "	Mar. 19, "	July 3, "	Sep. 16, "
1	5/16" "	9 " " "	9/32" "	June 15, "	July 1, "	Oct. 16, "

SYSTEM

2	3/0 Alum.	.....	.....	.....	.....	.....
1	4/0 S.R. Alum. 3 x 13 Gal. Steel	9/32" Gal. Steel	Nov. 4, 1920	Dec. 24, 1920	Dec. 20, 1920	Dec. 20, 1920
1	4/0 " 3 x 13 "	9/32" "	Dec. 17, 1919	Dec. 17, "	Dec. 20, "	Dec. 20, "
1	4/0 " 3 x 13 "	9/32" "	Mar. 1, "	Dec. 17, "	Dec. 20, "	Dec. 20, "
1	4/0 " 3 x 13 "	9/32" "	Oct. 27, "	June 11, "	Dec. 20, "	Dec. 20, "
1	4/0 " 3 x 13 "	9/32" "	May 3, "	July 8, "	Dec. 20, "	Dec. 20, "
1	4/0 S.R. Alum. 3 x 13 Gal. Steel	9/32" Gal. Steel	Nov. 20, 1920	.....	.....	.....

SYSTEM

1	3/0 Alum.	10 B&S C.C. Steel	4" Gal. Steel..	Oct. 29, 1912	June 14, 1913	Oct. 23, 191
1	3/0 " "	10 " " "	4" " "	Oct. 29, "	June 14, "	Oct. 23, "
1	5/16" Gal. Steel	10 " " "	1" " "	June 4, "	Dec. 15, "	Dec. 18, "
1	5/16" "	10 " " "	1" " "	June 4, "	Dec. 15, "	Dec. 18, "
1	5/16" "	10 " " "	1" " "	June 4, "	Dec. 15, "	Dec. 18, "
1	3/0 Alum.	10 " " "	1" " "	Sep. 6, 1913	Feb. 17, 1914	Feb. 7, 1914
1	3/0 " "	10 " " "	1" " "	Oct. 16, 1914	Mar. 20, 1915	Apr. 4, 1915
1	6 M.H.D. Copper	.....	.....	Feb. 22, 1915	Mar. 20, 1915	Mar. 20, "
1	3/0 Alum	9 BWG Gal. Iron	9/32" Gal. Steel	May 7, 1918	Feb. 23, 1919	Apr. 30, 1919
1	3/0 " "	9 " " "	9/32" "	May 7, 1918	Feb. 23, "	Apr. 30, "
1	336,000 C. M. S.R. Alum.	9 " " "	9/32" "	Sep. 24, "	May 5, "	Jun. 19, "
1	2 " "	.....	.....	June 29, 1920	Oct. 20, "	Oct. 20, 1920
1	2 " "	3 x 12 Gal. Steel	9/32" Gal. Steel	June 2 "	Dec. 31, 1920	.....
1	2 " "	3 x 12 "	9/32" "	June 4 "	.....	.....
1	2 " "	3 x 12 "	9/32" "	July 15, "	.....	.....
1	2 " "	3 x 12 "	9/32" "	Aug. 11, "	.....	.....
1	2 " "	3 x 12 "	9/32" "	Aug. 12, "	.....	.....
1	2 " "	.....	5/16" "	Oct. 8 "	.....	.....

SYSTEM

1	2 Copper	.....	6 B.W.G. Iron	Nov. 23, 1916	Apl. 26, 1917	Apr. 23, 1917
1	2/0 " "	10 B&S C.C. Steel	4" Gal. Steel	June 9, 1917	May 12, 1918	Jan. 22, 1918
1	1/0 " "	9 B.W.G. Iron	1" " "	Jan. 11, 1917	Nov. 7, 1917	Dec. 2, 1917
1	9/32" Gal. Steel	9 " " "	9/32" "	July 4, 1918	Feb. 15, 1919	Mar. 6, 1919
1	9/32" "	9 " " "	9/32" "	July 24, "	Feb. 12, "	Mar. 6 "
1	4/0 S.R. Alum. 3 x 13 Gal. Steel	9/32" "	9/32" "	June 24, 1919	Apr. 2, 1920	May 30, 1920
1	4/0 " 3 x 13 "	9/32" "	9/32" "	Sept. 17, "	Apr. 17, "	May 30, "
1	2 " "	.....	9/32" "	Apr. 9, 1920	July 8, "	July 19, "
1	2 " "	.....	9/32" "	Apr. 22, "	July 2, "	July 19, "

SECTION III

OPERATION OF THE SYSTEMS

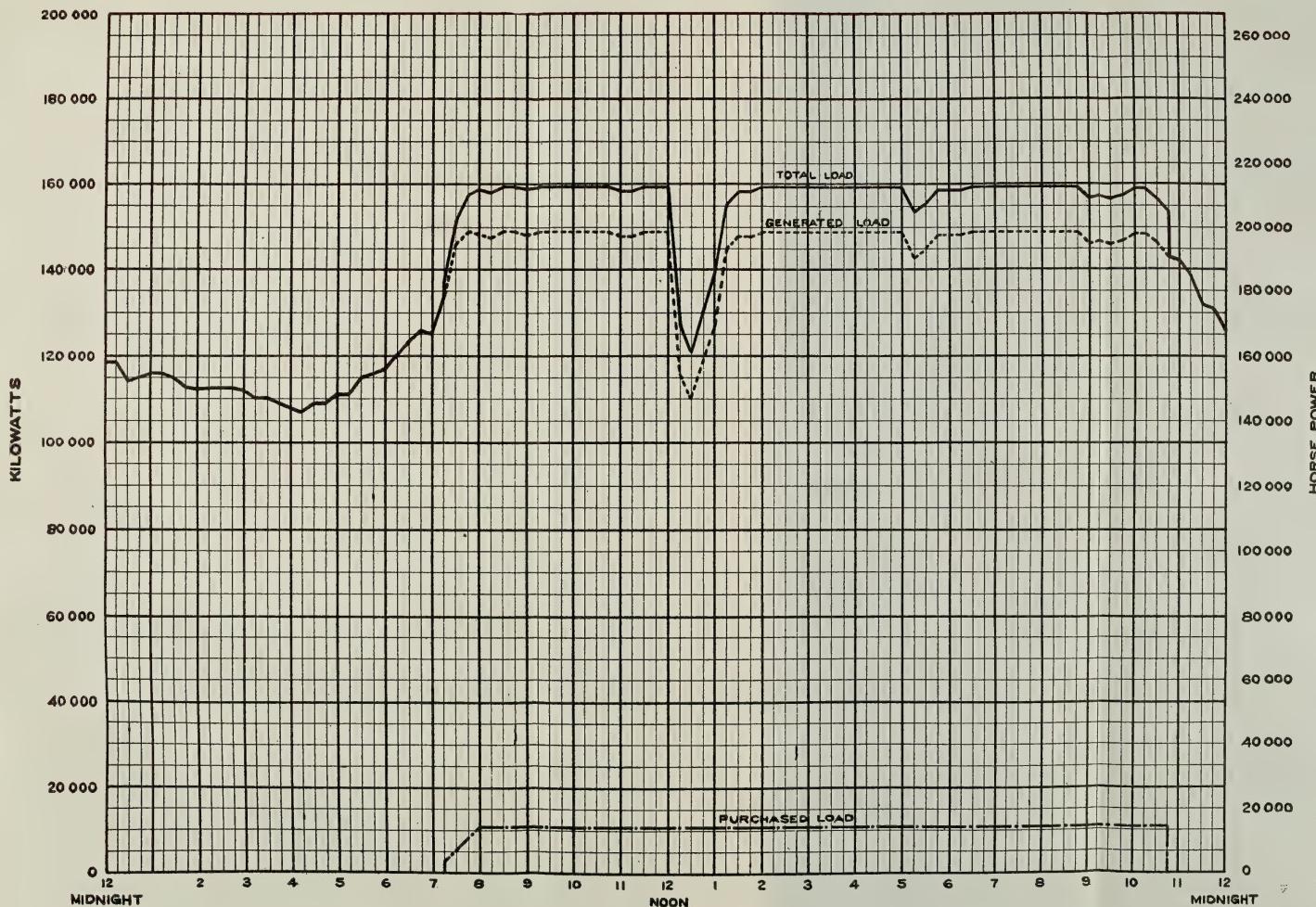
Ontario Power Company, 1919-1920

The operation of the Ontario Power Company, for the year ending October 31st, 1920, has not been marked by any unusual occurrences and no new construction of importance has been carried out. The completion of the plant last year brought its maximum capacity up to approximately 150,000 k.w., which with improved equipment and safer operating conditions, due to minor changes in apparatus, connections and layout, has made it feasible to give service to customers as nearly perfect as is commercially possible.

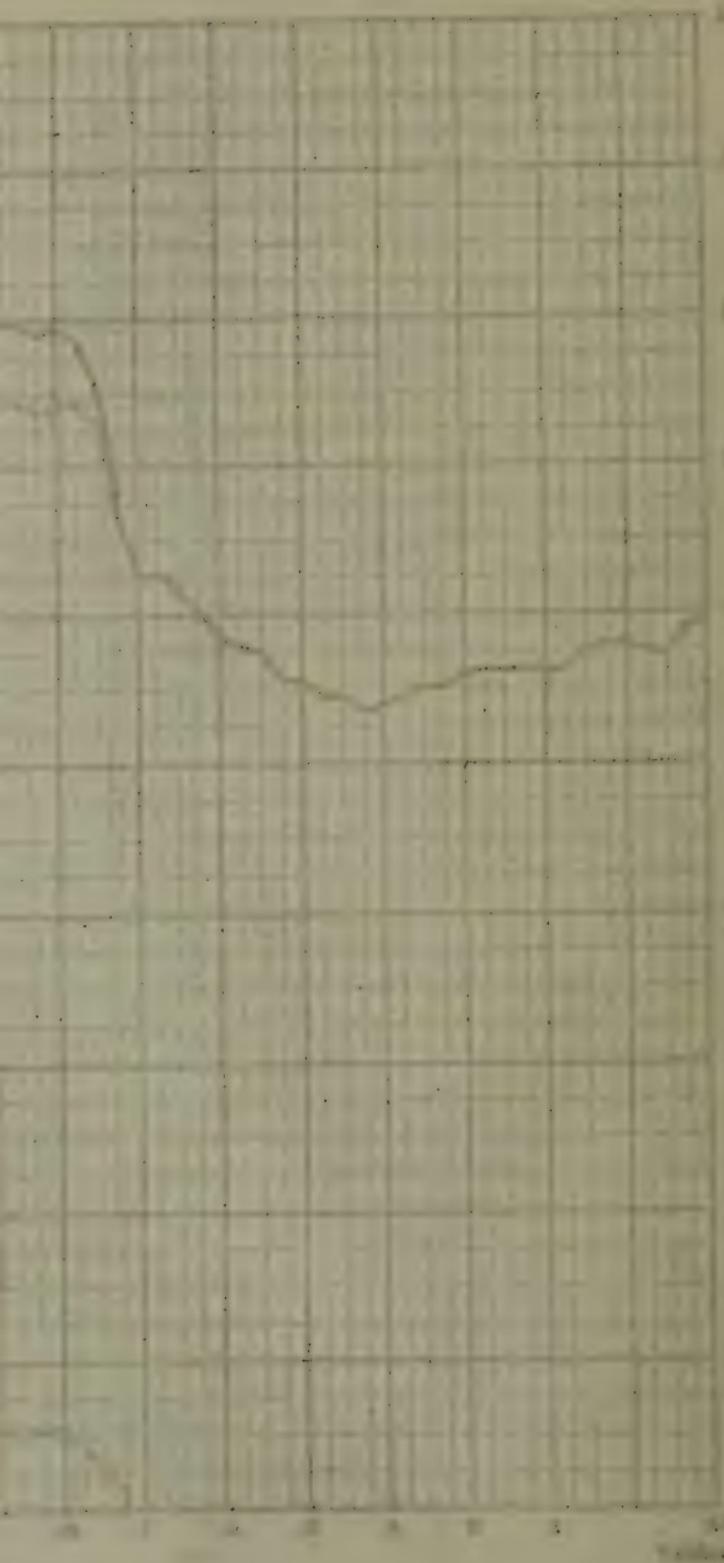
The unusually severe winter of 1919-20 did not interfere seriously with the operation of the plant, which, except for one or two days maintained an output only slightly less than normal, although ice conditions were unusually severe from the middle of December until the middle of May. There was no serious damage to equipment on account of the ice and the minor repairs necessary were attended to quickly with little or no interference to service.

In view of the widespread misunderstanding of the situation, by the public in general, it may be in order to outline briefly the reasons and circumstances under which ice in the river interferes with production of power. Ice starts to form in Lake Erie early in December, in the average winter and soon after begins to discharge through the Niagara River. Some ice also forms in the river, particularly along the shores, where on account of the shallow water, it picks up stones and other debris, which if taken into the power plants may damage the water turbines more or less seriously. A sudden change in temperature fills the water with slush or needle ice which, when it strikes the diverters intended to keep ice out of the plant, freezes into a solid mass and gradually blocks the openings through which the water flows. The blockage that results drops the head on the plant and is the cause of some decrease in output. This class of ice trouble is seldom serious, as the water passages are easily cleaned by dynamiting the ice with light charges. However, the presence of slush ice makes it impossible to use the racks ordinarily intended to prevent floating rubbish coming into the water wheels. The racks have to be removed at the first appearance of this ice in the river and the plant is, therefore, obliged to run without their protection for the remainder of the season. The slush ice carried into the plant passes through the turbines quite easily, and of itself is not dangerous, and probably accounts for only a slight decrease in efficiency, and a little lower output than with clear water. However, the heavier lake ice is too bulky to be discharged through the restricted passages of the turbines, and if once taken in, fills the turbines completely so that in a very short time their output is reduced to zero. When this condition obtains, the only practical solution is to allow the machine to continue to run as a synchronous motor, in case there is not enough water getting through to supply the friction losses, leave the turbine gates wide open and allow the water to gradually wear the ice away.

The Commission's supply of power is obtained partly from the Canadian Niagara Power Company, which, on account of its unfavorable location on the river,



**TYPICAL DAILY LOAD CURVES
THE ONTARIO POWER COMPANY
NOVEMBER 1919**



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is more subject to ice trouble than the Ontario Power Company's plant. Most of the power shortage caused by ice last winter was occasioned by ice blocking the machines at this plant. No expense, however, has been spared by the Canadian Niagara Power Company in attempts to eliminate or minimize this trouble, although their efforts have not yet been as successful as might be desired. The Ontario Power Company suffers chiefly from ice trouble when strong east winds are blowing which drive the ice fields to the west shore of the river and into the head works of the plant. On account of the formation of the river and the physical arrangement of the water inlets, it is impossible to keep all the ice out and a quantity, varying with the amount of ice in the river and the intensity of the wind, is bound to find its way into the water wheels.

The flow of ice in the river continues until the middle of May, due to the presence of large ice fields in Lake Erie, which, when driven to the east end of the lake by the prevailing winds, pass down the river and with unfavourable conditions may cause trouble in the generating station at a time when spring is well advanced. This was the case last year when large fields of lake ice did not break up until the middle of May, thus causing trouble for a short time in the plant at that late date.

While it is impossible to prevent ice troubles in the plants now constructed, due to the relation of the water inlet works to the river and on account of conditions which cannot now be changed, the same difficulties will not occur in the case of the new Queenston plant, which is being provided with the most modern means for keeping ice out of the canal, so that it can be confidently expected that with the completion of this plant no more serious trouble with river ice will arise. A great deal of study has been given this subject, and after elaborate experiments an arrangement of the water intake was designed which, it is fully expected, will eliminate the ice troubles to which the existing plants are subjected.

While no extensive alterations or additions were made to the power house and generating apparatus, a large number of improvements, not of great importance alone, but in the aggregate of real value to the plant, have been carried out. All the turbines and auxiliary equipment were overhauled and restored to their original efficiency. The runners on No. 12 turbine, replaced last year by castings supplied during the hurried production of war years, were not found entirely satisfactory, as, in fact, had been anticipated, and one of these was replaced. Other extensive repairs were made to this turbine to reduce the clearances and improve its efficiency.

An electric welding set has made it possible to reclaim defective runners and thus materially lengthen their life. The value of these runners fully warrants the expense incurred, even though the repaired runners should have a relatively short life, which is contrary to expectations.

The work started last year on rebuilding the operating mechanism of the nine-foot gate valves on Units 7 to 12 has been continued, and is now completed. All of these valves have been provided with rising stem operating mechanisms, the design of which has shown itself to be an unqualified success in operation. The old mechanisms had reached the limit of their useful life and were no longer reliable. In addition to rebuilding these valves, all the equipment in the valve chamber was repainted.

Work has been started on reconstructing the Voith relief valves for the Units 1 to 10. The present valves are nearly worn out, and as they are of an obsolete type, it was decided to rebuild them in accordance with designs of the Commission's Engineers, to meet the requirements of modern practice. It is expected

that their reliability of operation will be considerably improved by the changes contemplated.

All the exciter sets have been overhauled and restored to first-class condition. Guards have been provided over the exposed fans on these units which were a source of danger to workmen.

Improvements to the ventilation of the power-house were made, which have materially reduced the maximum temperatures prevailing during the hot weather. These changes consist largely in alterations to the existing system of cooling, so as to better its efficiency, and were carried out at very small expense, particularly in view of the excellent results obtained.

Changes have been made in the method of ventilation for the generators, with a view to eliminating the chance of destruction of the machines due to internal fires. Recent experiences have shown that the generally accepted schemes of forced air ventilation for large semi-enclosed and totally enclosed generators were undesirable in view of the added risk to the machines from fire. Careful experiments were made, from which it was conclusively shown that such a method of ventilation was no better than the simpler and very much safer ideas that were under consideration and which were then adopted.

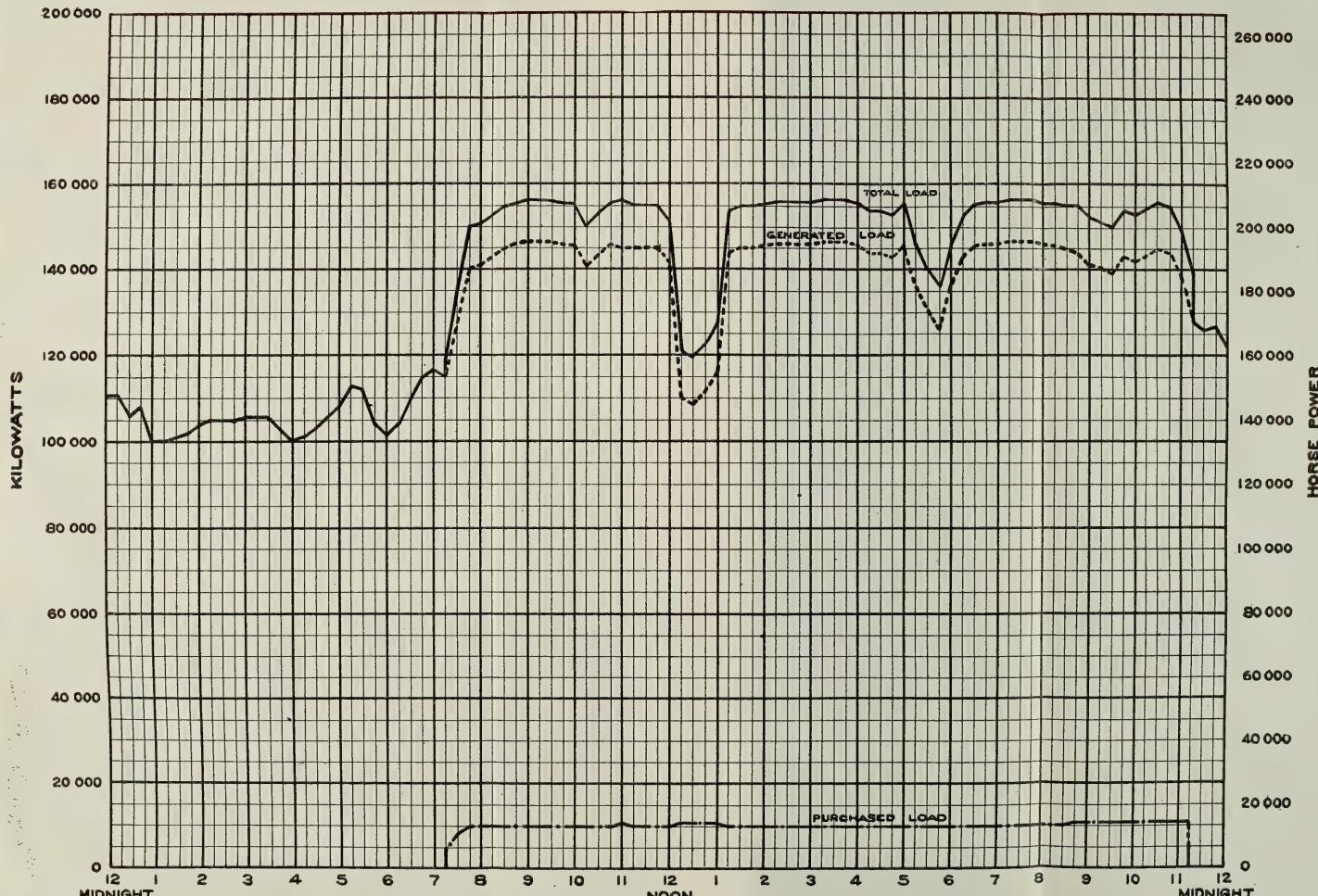
No changes of any consequence were made in the grouping of machines on the different busses, but some temporary work erected during the war was done away with and permanent connections installed.

Relay systems and metering equipment have not been changed to any extent, although minor improvements have been made. New type graphic ammeters have been installed on the different generators, to replace those of older designs which failed in service. The older types are still being maintained on some units, but will be replaced as soon as it is convenient to do so.

The step-up transformers used for supplying 60,000 volt power were overhauled and, where time permitted, extra bracings added to lessen chance of failure of the transformers on short circuit. This work is not entirely completed, but is being proceeded with whenever it is possible to get these units out of service.

The 60,000-volt line entrance structure and lightning arresters were completely reconstructed to replace the old equipment which, due to wear and tear, was no longer in safe operating condition. These changes were successfully carried out without interrupting the supply of power to the customers fed from the 60,000-volt lines.

No new lines were built by the Ontario Power Company during the past year. All lines were overhauled and necessary repairs made. In a few instances improvements in the way of more flexible switching arrangements were made. A connection was constructed by which power supplied to the Hydro-Electric Power Commission from the Canadian Niagara Power Company is transmitted to the Commission's Niagara Station through the Ontario Power Company's lines and Distributing Station. This connection was erected as a temporary expedient to relieve the shortage of power in the quickest possible time, and is not marked by any special features. Reactances were installed at the Ontario Power Company's end of this line to limit short circuit current.



**TYPICAL DAILY LOAD CURVES
THE ONTARIO POWER COMPANY
OCTOBER 1920**

TABLE No. 1.—SUMMARY OF POWER GENERATED
THE ONTARIO POWER COMPANY OF NIAGARA FALLS, 1919-20

Month	Max. Gen. Load, K.W.	K.W. Hrs. Generated	K.W. Hrs. Sold in Canada	K.W. Hrs. Exported	Average Gen. Load K.W.	Load Factor per cent.
November, 1919.....	152,000	89,419,900	62,786,300	26,633,600	124,200	81.7
December, 1919.....	152,000	94,857,000	66,276,200	28,580,800	127,500	83.8
January, 1920.....	149,300	94,903,300	64,304,000	30,599,300	127,600	85.4
February.....	147,400	82,798,900	53,088,300	29,710,600	119,000	80.7
March.....	147,000	86,607,000	55,480,100	31,126,900	116,400	79.2
April.....	144,000	80,350,300	53,606,700	26,743,600	111,600	77.5
May.....	148,300	82,129,100	52,672,400	29,456,700	110,400	74.5
June.....	148,000	80,543,700	50,565,400	29,978,300	111,900	75.5
July.....	147,800	78,657,200	49,267,300	29,389,900	105,700	71.5
August.....	148,000	82,139,300	52,231,600	29,907,700	110,400	74.5
September.....	149,000	82,967,500	54,512,900	28,454,600	115,200	77.4
October.....	149,500	90,838,300	61,042,200	29,796,100	122,100	81.6
Total .....	.....	1,026,211,500	675,833,400	350,378,100	116,800	

The maximum generated loads are momentary peaks. The load factor is the average load divided by the maximum momentary peak and multiplied by 100.

TABLE No. 2.—SUMMARY OF GENERATION AND DISTRIBUTION
ONTARIO POWER COMPANY OF NIAGARA FALLS, 1919-1920

Month	Max. Output O.P. Co., H.P.	Max. Purch. Power, H.P.	Max. Total, Combined Output, H.P.	K.W. Hrs. Gen. O.P. Co.	K.W. Hrs. Purchased	K.W. Hrs. Sold
November, 1919..	201,472	15,147	215,552	89,419,900	4,048,100	93,468,000
December, 1919..	201,472	14,879	216,222	94,857,000	4,760,500	99,617,500
January, 1920....	197,452	14,745	213,137	94,903,300	5,576,600	100,479,900
February.....	195,040	15,416	208,842	82,798,900	4,607,700	87,406,600
March.....	194,370	15,416	208,847	86,607,000	4,995,500	91,602,500
April.....	190,350	15,282	201,874	80,350,300	4,662,000	85,012,300
May.....	195,040	15,818	209,378	82,129,100	4,105,700	86,234,800
June.....	196,380	15,550	211,532	80,543,700	4,555,300	85,099,000
July.....	196,380	15,282	210,456	78,657,200	5,775,600	84,432,800
August.....	197,050	15,416	211,528	82,139,300	4,577,100	86,716,400
September.....	197,721	15,147	212,466	82,967,500	4,854,200	87,821,700
October.....	199,730	15,818	212,872	90,838,300	2,802,500	93,640,800
Totals.....	.....	.....	.....	1,026,211,500	55,320,800	1,081,532,300

Niagara System, 1919-1920

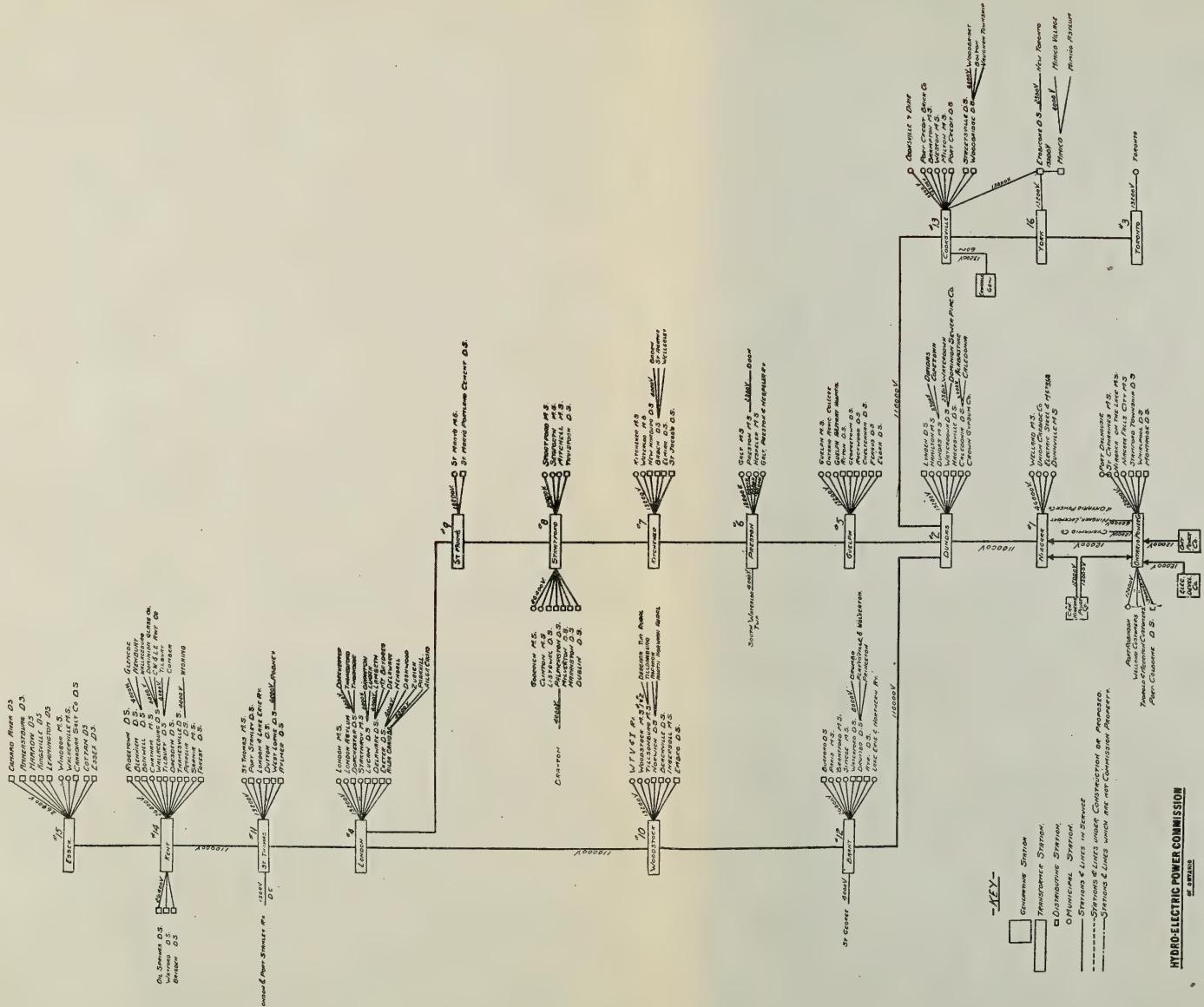
The operation of the Commission's Niagara System, consisting of 16 high tension stations, 121 distributing and metering stations, 99 customers' stations, 1,054 pole miles of low tension feeders, 449 pole miles of telephone lines and 466 tower miles of high tension lines, was for the past year most encouraging. During practically the entire period the power shortage was very acute, and the difficulties encountered in keeping the system operating under such conditions most severe. It was necessary to place restrictions on all customers during the entire year, and it reflects very creditably on the co-operative spirit between the

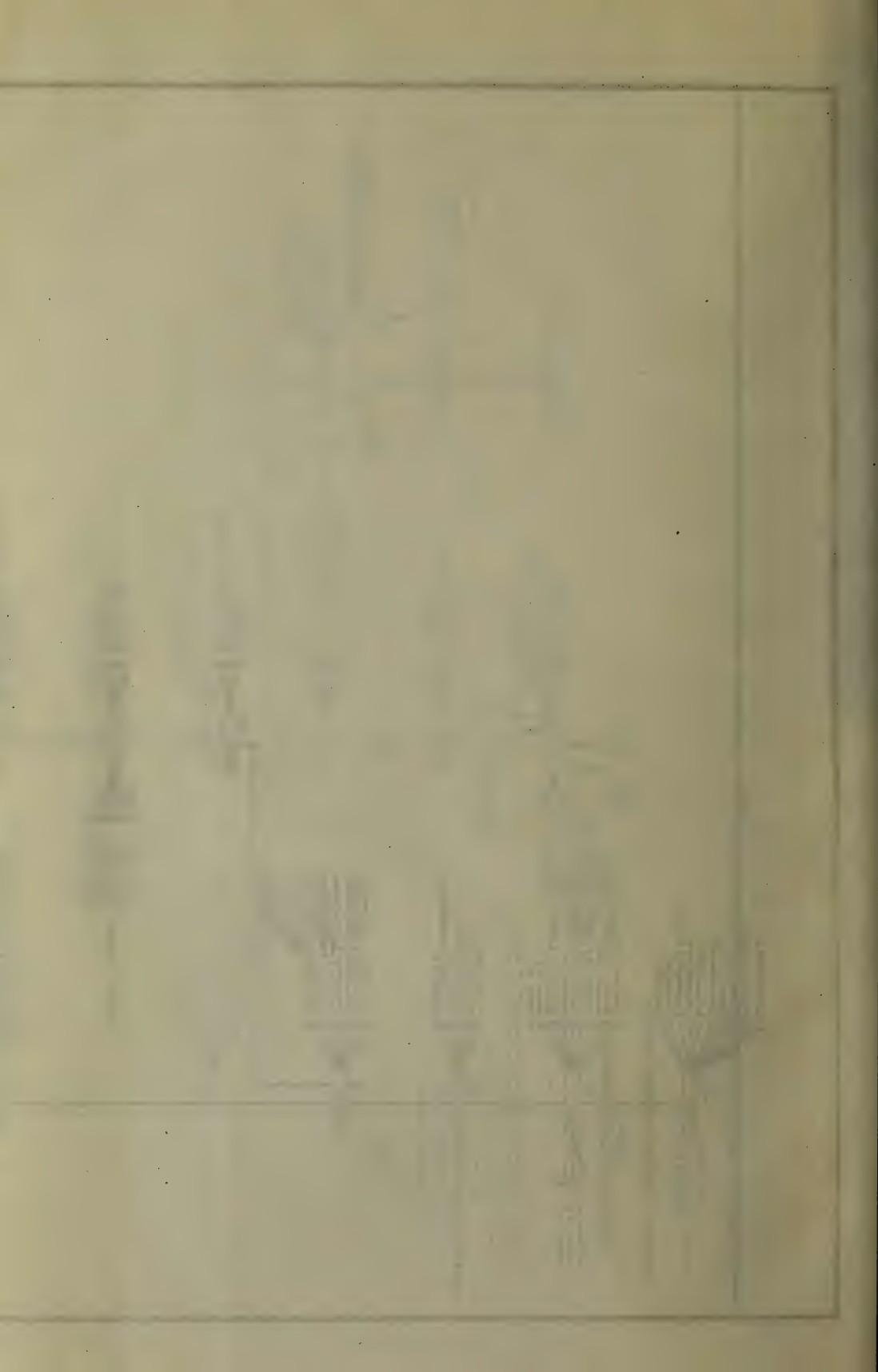
Commission and its customers that the service supplied was of such high order. With a view to alleviating, to some extent, the power shortage, the Commission arranged to purchase from the Canadian-Niagara Power Company the output of one of their machines of approximately 9,000 h.p. capacity. This machine, which was connected to our service on January 1, 1920, bettered conditions for a short time until the normal increase in the customers' loads made itself felt, with the result that the shortage problem remains as serious as earlier in the year. The power shortage was greatly intensified, due to Toronto Power Company removing from our service on October 15th one of their machines of approximately 13,000 h.p., the lease for which expired on that date. Previous to this time the Commission, realizing the seriousness of losing a block of power of this magnitude, had opened negotiations with the Toronto Power Company for the renewal of the contract, but were unable to make satisfactory arrangements. However, it is fully expected such arrangements will be completed at an early date.

The power supplied from the Ontario Power Company was most satisfactory, and with the exception of an exceedingly short time, continuous. The ice conditions on the Niagara River during the winter of 1919-1920 were the most severe experienced in many years; nevertheless, the output of the plant was maintained at practically normal.

The supply from Canadian Niagara Power Company of 50,000 h.p. to our Niagara High Tension Station was, with the exception of a period covered by ice troubles, very satisfactory. During the ice trouble period, however, the Canadian Niagara Power Company plant was greatly affected, and in some instances our supply was reduced to one-quarter of normal. With the exception of the month of March, the ice trouble period extended from December 17th, 1919, to May 13th, 1920, and during all this time our normal supply was more or less affected, and in consequence the supply to customers on the High Tension System correspondingly affected. The rapidly changing conditions at the Canadian Niagara Power Company's plant worked considerable hardship on the Niagara System, in that it was impossible to predict with any degree of certainty an hour in advance the amount of power we would receive, and consequently the customers could not be advised of their available supply.

Two very severe storms were experienced during the year, the first, occurring on November 29th, 1919, was general and caused considerable damage over the entire country. However, with a few exceptions, the Commission's lines and equipment came through in good condition, and the only inconvenience experienced was caused by short interruptions to low tension feeders, due to branches and trees being blown across the circuits. No trouble of any consequence was experienced on the high tension tower lines during this very severe storm. The second, occurring on July 23rd, 1920, was most severe in the district between Dundas and Niagara, and although some damage was occasioned, four towers being blown over and completely wrecked in one of the tower lines near Smithville, there was no total interruption to the service on the system, and temporary repairs had been made and the lines restored to service within twenty-four hours. The period during which lightning disturbances were reported from our different high-tension stations extended from March 16th to October 24th, and totalled 43 storms in all, three of which were general, passing over the entire system. The apparatus installed to relieve the system of excessive surges set up due to lightning disturbances proved most effective, in that no system interruption occurred from this cause.





During the year the capacity of a number of stations was increased as follows: At Niagara Station one bank of 3,500 k.v.a transformers was connected to the 110,000-volt bus; at London one bank of 2,500 k.v.a. transformers replaced one bank of 1,250 k.v.a. transformers; at Woodstock one bank of 1,250 k.v.a. transformers replaced one bank of 750 k.v.a. transformers; at Brant one bank of 2,500 k.v.a. transformers replaced one bank of 1,250 k.v.a. transformers; while at Kent one bank of 1,250 k.v.a. transformers replaced the temporary bank of 750 k.v.a. transformers. At the Elmira Distributing Station the capacity was increased to 450 k.v.a. from 225 k.v.a., at Listowel to 600 k.v.a from 300 k.v.a., and at Norwich to 225 k.v.a from 150 k.v.a. The Ailsa Craig load was removed from the Lucan Station' transformers and connected to a bank of 75 k.v.a. transformers in the Ailsa Craig Station, which was completed during the year.

The Line Maintenance Field Force made their annual test of all insulator units on the high-tension lines, and any which were below standard were removed and replaced with good units. The benefit derived from such procedure is shown in a most marked manner in that no system interruptions, due to line insulators failing, have occurred for a number of years. The usual routine of maintaining the high-tension lines, the numerous low-tension feeders and telephone lines is handled by this force, and these men are always available to assist any customer should they request aid. In addition to the above regular work, our line staff, during the year, completed the restringing of the high-tension section between Kitchener and Stratford, replacing the iron conductor with 6/0 steel reinforced aluminum conductor. The operating conditions in the Stratford and St. Mary's districts were considerably improved by this change. During the war we found it necessary to increase the carrying capacity of some of our trunk feeders, and since it was impossible to secure aluminum from the manufacturer, we were forced to secure same elsewhere. At this time the aluminum conductor on the 4,000-volt feeder, between Tilbury and Comber, was replaced with an iron line; however, due to the increasing power demand at Comber during the past year, it was necessary to take down the iron conductor and replace it with No. 2 steel reinforced aluminum.

The necessity for additional private telephone lines between the Commission's Head Office at Toronto and the Dundas Switching Station has been very keenly felt for some time, and after considerable investigation it was decided to introduce a transposing scheme of the present four physical circuits, so as to obtain in addition two phantom circuits, which are distinct talking circuits. The cost of obtaining the necessary extra talking circuits in the above manner was very much less than that of erecting two additional physical circuits, and the results obtained since the completion of this work show clearly that we were well advised in handling same in the manner stated. The engineering details were handled by the Operating Department's Telephone Engineer, and the field work by the line maintenance section of the Operating Department.

Outdoor 110,000-volt switching structures were erected at our Brant and Woodstock High-Tension Stations, tapping the through line from Dundas to London at these points, and having the necessary switches for sectionalizing the line for maintenance and operating purposes. The increased flexibility in the operation of the high-tension line between Dundas and London and the benefits derived by reason of same during insulator testing periods much more than compensates the expense in erecting such structures. In connection with the double circuiting during the coming year of the high-tension line between Dundas and Kitchener,

it has been decided to erect similar switching structures at our Preston and Guelph Stations.

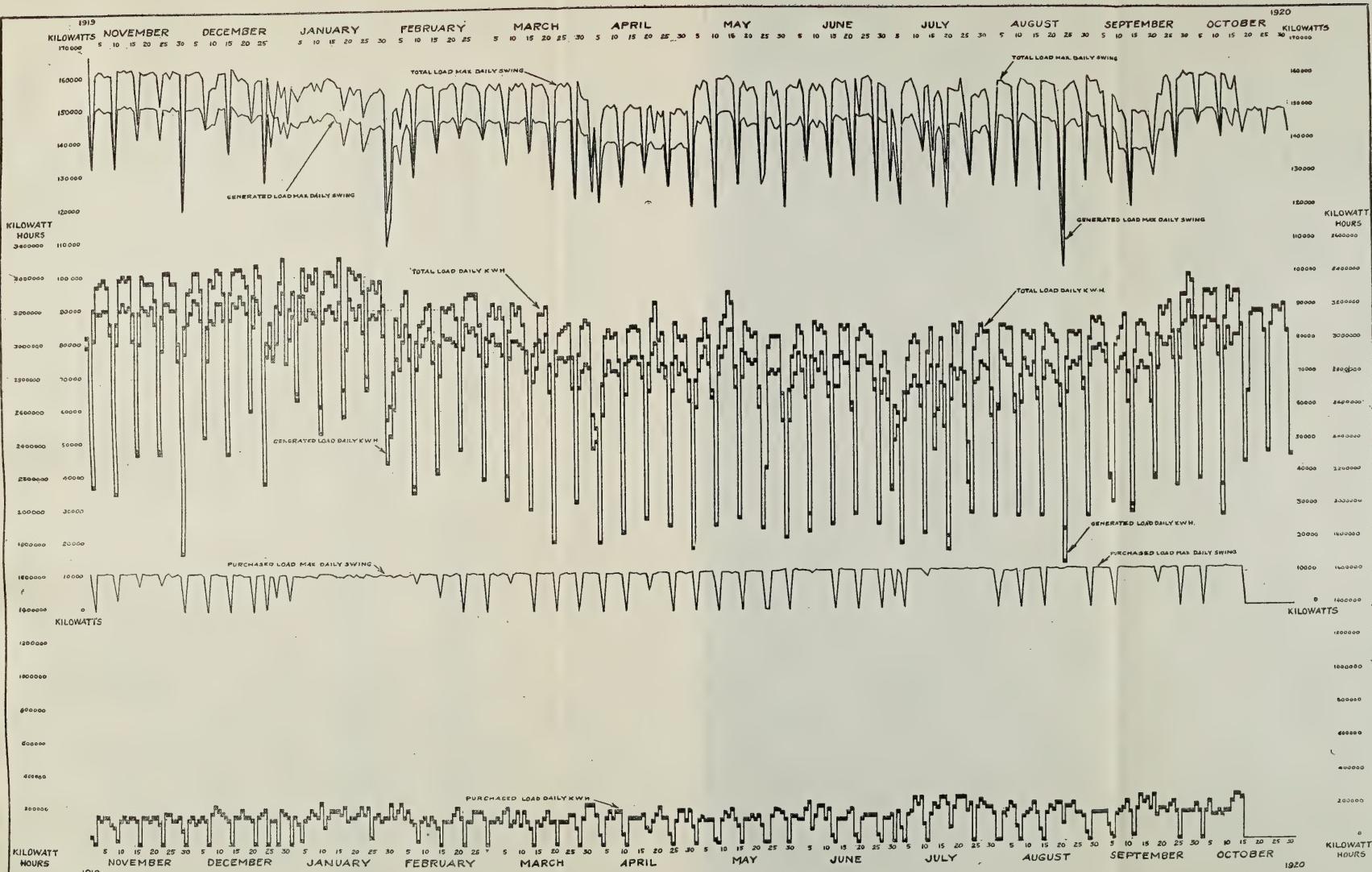
The Commission maintains, in connection with its Operating Department, a Station Maintenance Field Staff, whose routine duties consist of maintaining in operating condition the equipment in all the high-tension and distributing stations. Municipalities and customers frequently call on the Commission for assistance in repairing and overhauling their equipment, and the service of this staff is at their disposal at all times. The rebuilding and returning to service of transformers which may fail from any cause whatsoever is handled by this staff with greater dispatch and more economically than could be obtained by returning the defective units to the manufacturer for repairs. Additional bracing was added to a number of the smaller transformers, in order to strengthen the winding and make the transformer less susceptible to damage, due to the heavy mechanical strains imposed during trouble.

The two 4,000 k.v.a. condensers which had been installed at Toronto Station some time ago, and which were purchased second-hand, developed trouble due to defective insulation on the windings, and it was considered advisable to completely rewind them, and they were, therefore, forwarded to the Canadian General Electric Company's factory at Peterboro, the iron repunched, new coils manufactured, increasing the capacity to 5,000 k.v.a. One of these machines has been returned and reinstalled during the past year, and it is expected that the other will be ready for service in the near future. These machines are of considerable importance in improving the voltage on the high-tension system, and more especially at Toronto, and in relieving the generating equipment at Niagara Falls of a heavy current overload by improving the low-power factor conditions on the system.

The Meter Section of the Operating Department by systematic inspection has maintained the various station metering equipments at a high degree of accuracy. The relay protective devices which also come under the care of the Meter Section have been given routine checks, and careful studies of relay problems have been made, with a view to improving service wherever possible.

In addition to the above the Meter Section has been called upon to make many intitial inspections of new installations, and the services of this department have been requisitioned frequently by municipal systems and others for various inspections and special tests.

The Operating Department's Meter Repair Shop, which is located in the Toronto Service Building, and which is operated under the supervision of the Meter Section, has been of great service, not only in making rapid repairs, but in the production of special apparatus.



**THE ONTARIO POWER COMPANY
SUMMARY OF DAILY LOADS
1919 - 1920**

Municipality	Load in H.P. October, 1919	Load in H.P. October, 1920	Increase
Acton	173	193	20
Ailsa Craig	103.2	128.6	25.6
Aylmer	156.8	172	15.2
Ayr	41.5	77.2	35.5
Baden	152.3	175.6	23.3
Beachville	183.6	223	39.6
Blenheim	123.3	134	10.7
Bolton	130.6	105.9	—
Bothwell	119.7	120.6	.9
Brampton	848.5	965	116.5
Brantford	3,056.4	4,162	1,105.6
Brigden	93.8	107.1	13.3
Burford	54.7	37.8	—
Burgessville	29	42.4	13.4
Caledonia	58.3	83	24.7
Chatham	1,340.5	2,151.5	811
Clinton	168.3	154	14.3
Comber	26.8	135.4	108.2
Cooksville	63.6	—	—
Dixie			
Dashwood	49.6	52.6	3
Delaware	9.7	11.7	2
Dorchester	24.3	89.8	65.5
Drayton	44.2	48.2	4
Dresden	250.6	196.3	—
Drumbo	16	21	5
Dublin	22.5	45.3	22.8
Dundas	1,091.3	1,132.7	41.4
Dunnville	248	241.3	—
Dutton	101.8	107.2	5.4
Elmira	185	213	28
Elora	219.8	194.3	—
Embroy	44.2	58.4	14.2
Essex County	911.5	1,126	214.5
Etobicoke Township	236	335	99
Exeter	148.7	175.6	26.9
Fergus	147.7	185	37.3
Forest	118	116	—
Galt	2,634	2,931.5	297.5
Georgetown	421	524	103
Goderich	362	496	134
Granton	39.5	67.7	28.2
Grantham Township	29.5	26	—
Guelph	3,255	3,638	383
Guelph Military Hospital	179.6	160.8	—
Guelph O. A. College	166.2	147.4	—
Hagersville	242.6	260	17.4
Hamilton	14,937	17,895	2,958
Harriston	122	227.8	105.8
Hensall	50	85.7	35.7
Hespeler	375.3	348.5	—
Highgate	76.4	86	9.6
Ingersoll	930.2	1,085.7	155.5
Kitchener	5,784.2	6,648.8	864.6
Lambeth	16	22.7	6.7
Listowel	372.6	453	80.4
London	10,757	10,656.8	—
Lucan	155	216.6	61.6
Lynden	92.5	87.8	—
Milton	608.5	670	61.5
Milverton	274	290.8	16.8
Mimico	265.4	388.7	123.3
Mimico Asylum	32.1	37.5	5.4
Mitchell	181	195.7	14.7
Moorefield	36.2	123.5	87.3
Mt. Brydges	26.8	23.1	—

Municipality	Load in H.P. October, 1919	Load in H.P. October, 1920	Increase
Niagara Falls	2,707.8	3,610	902.2
Niagara-on-the-Lake	158.2	229.2	71
New Hamburg	225.2	236	10.8
New Toronto	3,036.2	3,284.2	248
Norwich	203.3	223	19.7
Oil Springs	112	95	—
Otterville	34.2	33.5	—
Palmerston	101.8	191.6	89.8
Paris	682.3	643.4	—
Petrolia	383.4	442.3	58.9
Petersburg and St. Agatha	21.4	17	—
Plattsville	100.5	100.5	—
Port Credit	87.1	103.2	16.1
Port Dalhousie	122.6	144.7	22.1
Port Stanley	75.7	124.6	48.9
Preston	1,374	1,485.2	111.2
Princeton	8.8	15.6	6.8
Provincial Brick Yard	136.7	123.3	—
Ridgetown	155.5	173.6	18.1
Rockwood	56.3	41.2	—
Rodney	41.8	91.6	49.8
Sarnia	2,486.6	2,795	308.4
Seaforth	325.7	281.5	—
Simcoe	187.6	214.4	26.8
St. Catharines	3,070	3,477	407
St. George	61.6	60.3	—
St. Jacob's	92.5	88.4	—
St. Mary's	560.3	878	317.7
St. Thomas	2,356.5	2,417	60.5
Stamford Township	200	423.5	223.5
Stratford	1,662.3	2,024	361.7
Strathroy	225.2	387.4	162.2
Tavistock	266.7	264	—
Thamesford	95.8	83	—
Thamesville	56.3	62.7	6.4
Thorndale	120	110	—
Tilbury	87.1	131.3	44.2
Tillsonburg	762.7	819	56.3
Toronto	56,944	59,598	2,654

(10) New Municipalities—Niagara System

Municipality	Date Connected	Initial Load in H.P.	Load in H.P. October, 1920	Increase
Port Colborne.....	March 1st, 1920	273	270	—
Markham.....	April 1st, 1920	20	37	17
Parkhill.....	May 3rd, 1920	40.2	48.2	8
Glencoe	August 14th, 1920	45.5	67.5	22

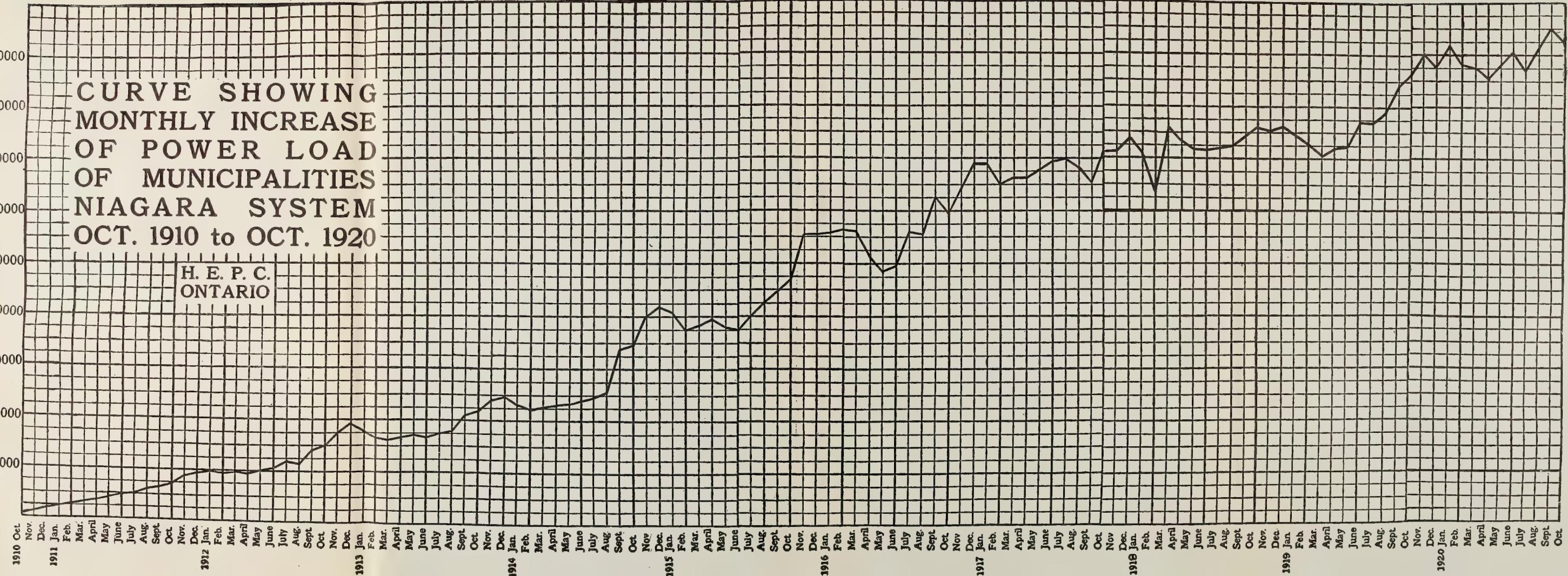
Severn System

The generation and distribution of power for use by the municipalities on the Severn System has been carried on very satisfactorily during the year. The power for the system is generated at the Big Chute Plant on the Severn River, but when the demand by the customers on this system exceeds the maximum capacity of the plant, power is obtained from the Commission's generating stations at Eugenia and Wasdell's Falls.

Horse-Power

**CURVE SHOWING
MONTHLY INCREASE
OF POWER LOAD
OF MUNICIPALITIES
NIAGARA SYSTEM
OCT. 1910 to OCT. 1920**

H. E. P. C.
ONTARIO



Horse-Power

Horse-Power

CURVE SHOWING
MONTHLY INCREASE
OF POWER FOR
THE MONTGOMERY
NIAGARA SYSTEM
ON OCT. 10, 1910.

100000
80000
60000
40000
20000
0

The Big Chute Plant, the Eugenia and Wasdell's Plants of the H.E.P.C., and the Swift Rapids Plant of the Orillia Commission have operated this year very successfully in parallel, with decided benefit to all systems served.

Adequate housing and storeroom facilities at the Big Chute Plant for the live stock and transportation equipment were arranged by remodelling and reconstructing the old construction camp buildings.

A permanent roadway was opened up between the Big Chute Plant and Severn Falls on the C.P.R., a distance of about six miles, to afford the required transportation facilities for getting in or out supplies, repair parts, or medical attention, if necessary, during the spring and fall. During the spring break-up, and sometimes during the fall months, transportation by river becomes practically impossible.

A suitable building for storeroom, and for housing the machine shop tools required in connection with maintenance work, was erected at the Big Chute Plant.

A small office building was erected on the switching station property at Waubaushene, and an office opened to handle the details on the Severn System and Combined System operation and maintenance.

Considerable maintenance work was carried out on the high-tension lines between Waubaushene and Big Chute, and the switching structure at Black River on this section of the line was completely overhauled. On a number of sections of high-tension lines exposed to severe wind storms, additional storm guys were installed to increase strength of these sections.

On several of the high-tension lines where the poles are affected to some extent by rot at the ground line, considerable maintenance work was carried out to strengthen these lines.

An S. & C. 22,000-volt arrester was installed at Thornton Station this spring, which has apparently been of considerable benefit to the station equipment and to the system in general.

Severn System

Municipality	Load in H.P. October 1919	Load in H.P. October 1920	Increase
Midland.....	1,160.8	1,362	201.2 .
Penetang.....	832.8	900.8	68
Collingwood.....	1,309.6	1,286.8	....
Barrie.....	654	750.6	96
Coldwater.....	47	49.5	2.5
Elmvale.....	103.2	111.2	8
Stayner.....	140.4	184	43.6
Creemore.....	49.5	45.8	....
Waubaushene.....	23	26.1	3.1
Pt. McNicoll.....	32.1	36	3.9
Victoria Harbor.....	46.6	48.2	1.6
Camp Borden.....	163.5	139.4	....
C.P.R. Elevator.....	1,290.7	1,099	....
Cookstown.....	69	55	....
Alliston.....	122	132.7	10.7
Bradford.....	38.8	52.2	13.4
Beeton.....	84.4	89	4.6
Tottenham.....	24.7	31.2	6.5
Thornton.....	10	12	2

Eugenia System

The operation of the Eugenia System has been very satisfactory this year, and the load has increased over the previous year.

The power for the system is generated at Eugenia Falls Power House, and this plant is operated in parallel with the H.E.P.C. plants at Big Chute on the Severn System, Wasdell's Plant on the Wasdell's System, and the Swift Rapids Plant, owned and operated by the Orillia Water, Light and Power Commission. The parallel operation of these plants is a great benefit to all systems served.

The installation of the third unit, consisting of a 4,000 h.p. turbine, 2,820 k.v.a. generator, and 40 k.w. exciter, was completed and unit placed in service. The operation of this unit has been successful, and has aided to a great extent in the operation and maintenance of the plant. Previously the first two units were required in constant service to supply the system, rendering it impossible to shut down either of them for a sufficient length of time for proper overhauling. After the No. 3 unit was placed in service the No. 1 unit, of 2,000 h.p. capacity, was taken out of service and its turbine and generator completely overhauled.

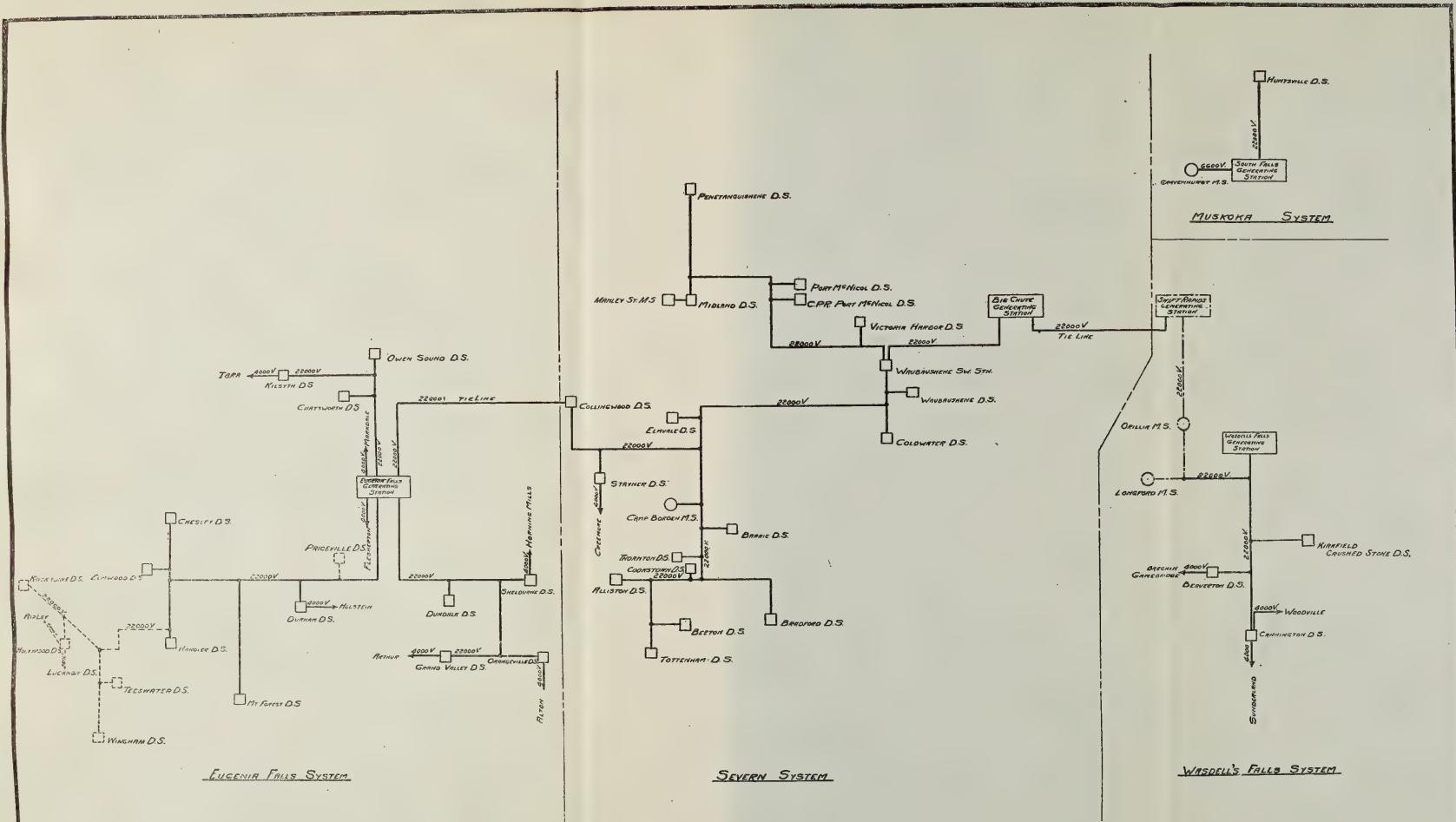
Johnson valves were installed on each of the old turbines in place of the old gate valves, which it had become almost impossible to operate under the head at this plant. The Johnson valves are hydraulically operated, and afford a very much more rapid means of controlling the water to the turbines.

The alterations made and additional equipment and transformer capacity installed at the Hanover Station allows increased load to be carried for the Hanover and Neustadt municipalities, with added facilities for operation and maintenance of the equipment at this station, and improved service to the customers fed out of the station.

On a number of sections of the high-tension line which were exposed to severe wind storms, additional storm guys were installed to strengthen the line.

Eugenia System

Municipality	Load in H.P. October, 1919	Load in H.P. October, 1920	Increase
Owen Sound.....	1,139.4	1,340	200.6
Flesherton.....	67.6	55.4	—
Dundalk.....	93.2	104.5	11.3
Durham.....	85.7	130	44.3
Mt. Forest.....	152.2	192.7	40.5
Chatsworth.....	22.2	28.6	6.4
Markdale.....	99	90.6	—
Holstein.....	9.3	9.6	.3
Chesley.....	230.5	247	16.5
Shelburne.....	158	162.2	4.2
Orangeville.....	120	144.5	24.5
Horning's Mills.....	5	5	—
Grand Valley.....	59.9	63.6	3.5
Arthur.....	159.5	126	—
Hanover.....	650	727.8	77.8
Tara.....	31	53.6	22.6
Elmwood.....	52.9	58	5.1
Carlsruhe & Neustadt.....	64.3	104.5	40.2



**HYDRO-ELECTRIC POWER COMMISSION
of Ontario**

**DIAGRAM OF EUGENIA FALLS, SEVERN, WASDELL'S FALLS,
AND MUSKOKE SYSTEMS.**

60 CYCLES.

[Signature]
APPROVED:
CHIEF ENGINEER

DEVICTIONS -
OCT 25 1917
OCT 25 1918
OCT 25 1919
OCT 25 1920

- KEY -

GENERATING STATION

DISTRIBUTING STATION

MUNICIPAL STATION

STATIONS & LINES IN SERVICE

STATIONS & LINES UNDER CONSTRUCTION OR PROPOSED

STATIONS & LINES OWNED BY CORPORATION OF ORILLIA

Wasdell's System

The load on the Wasdell's System has shown an encouraging growth during the year, the load on the existing stations having increased and new customers being taken on. The generating plant at Wasdell's Falls, on the Severn River, has operated throughout the year in parallel with the Big Chute Plant on the Severn System, and the Eugenia Plant, and with the Swift Rapids Plant of the Orillia Commission. Although smaller than the other three plants with which it operates in parallel, it has added materially to the successful results obtained.

The excess power available at Wasdell's, over and above the demands by the customers on the Wasdell's System, is by aid of the parallel operation transmitted and used by the customers on the Severn System.

The system was extended to serve the Municipality of Kirkfield and the plant of the Crushed Stone Company, Ltd., near Kirkfield. Also several rural extensions were added to serve farming districts on the south end of the system.

The removal of the steel conductor on certain portions of the high tension line and the replacing of same by aluminum conductor was of considerable benefit in connection with the regulation of voltage and operation of the System.

To facilitate the transmission of the necessary instructions and messages relating to the operation of the Wasdell's generating station in parallel with the other plants, and in connection with the operation and maintenance work on the Wasdell's System, the telephone line was double-circuited between the Power House and Fawkham Junction. This arrangement permits the use of one telephone line for communication between Wasdell's Plant and the other plants operating in parallel, and the use of the other line in connection with the operation and maintenance work on the Wasdell's System. This arrangement has proved a benefit to the system.

The turbines and generators at this plant were completely overhauled during the summer.

Extensions were made to the operator's cottage at Wasdell's Plant. The kitchen was enlarged and a verandah added to the front of cottage, to furnish better facilities for the comfort and housing of the operating staff at this plant.

Wasdell's System

Municipality	Load in H.P. October, 1919	Load in H.P. October, 1920	Increase
Beaverton.....	100.5	88.4	—
Brechin	65	81	16
Cannington.....	70.3	101.8	31.5
Sunderland.....	40.2	75.5	35.3
Woodville.....	50	89.5	39.5

New Municipality—Wasdell's System

—	—	Initial Load H.P.	Load in H.P. October, 1920	Increase
Kirkfield.....	Connected June 18th, 1920	10.5	15.6	5.1

Muskoka System

The generation and distribution of power for use by the Municipalities of Huntsville and Gravenhurst, on the Muskoka System, has been very satisfactory during the year. The power for distribution is generated at the South Falls Plant, on the south branch of the Muskoka River, about three miles south of Bracebridge.

Certain repairs were completed on the main dam at this plant that greatly strengthened this structure, and made it possible to use the river flow more efficiently for power purposes. No trouble was experienced at this plant during the summer due to water shortage.

Muskoka System

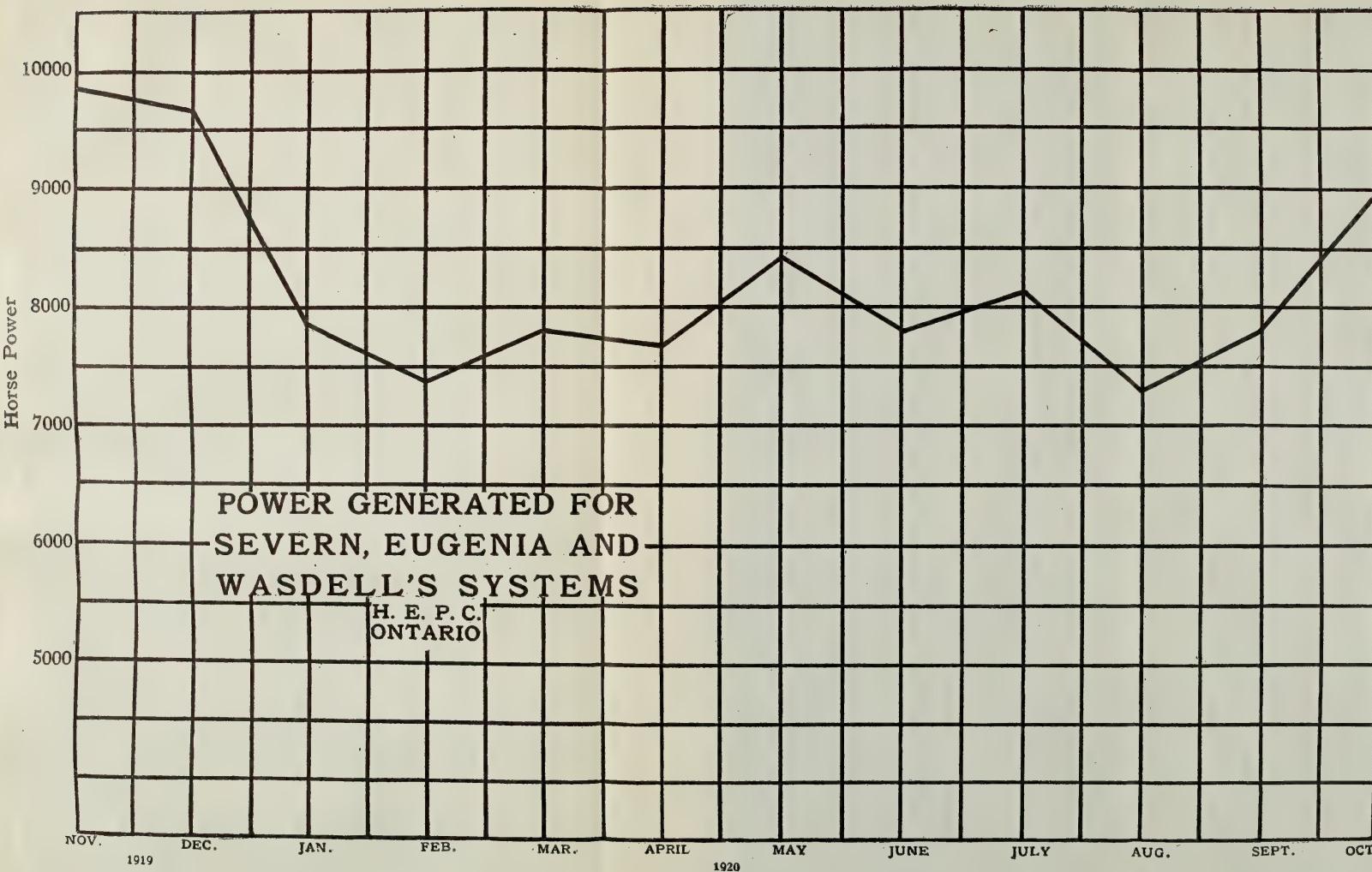
Municipality	Load in H.P. October, 1919	Load in H.P. October, 1920	Increase
Gravenhurst.....	827	611	—
Huntsville.....	841.8	655.5	—

St. Lawrence System

The St. Lawrence System has enjoyed a year of ample power supply and one which has not been notable for any particular operating features. Shortly after the completion in January of two operators' cottages at Cornwall, a reduction in the staff was made which has resulted in a noticeable saving. Attendants had been continually on duty in the station, three shifts being maintained, but the installation of bell alarms in the station and cottages, so arranged that the automatic opening of any of the oil switches, or the failure of the water supply on either of the transformers would ring them, made it possible to dispense with one operator, maintaining a staff consisting of a superintendent, one operator, and one line patrolman with some experience in station operation. This method of operation worked out very well in practice.

For the convenience of the Toronto Paper Company, temporary power was supplied to them during the latter part of March and the early part of April, amounting in all to about a month, during which the Department of Railways and Canals had unwatered the Cornwall Canal and thus made the Company's hydraulic-driven generator inoperative. This additional power amounted to about 475 h.p., and largely accounts for the abrupt increase in the system load for these months.

Neglecting the unnatural shape of the load curves for March and April, a gradual though substantial increase is evident; in fact, October, 1920, shows an increase of 500 h.p. over October, 1919, and while this year's operation has been without particular incident, all present indications point to an unprecedented expansion during the coming fiscal year.



St. Lawrence System

Municipality	Load in H.P., Oct., 1919	Load in H.P., Oct., 1920	Increase
Brockville.....	965	1,048	83
Prescott.....	251	220	..
Winchester.....	82	96	14
Chesterville.....	150	130	..
Williamsburg	25	17.6	..
Toronto Paper Co.	288	725	437

Central Ontario System

Owing in part to the number of generating stations and the various loops and rings in the transmission network of the Central Ontario System, the service has been of a very high standard, both as to continuity and voltage regulation. Line trouble, when experienced, has been for the most part confined to short sections, through the selective action of relays, which automatically isolate and cut out sections on which trouble develops without disturbing the rest of the system. No complete system interruption has occurred during the year, and each town has, as a rule, been interrupted only when trouble has occurred on its own particular section.

A very important line was added to the system May 30th, when the Healy Falls-Peterboro line was put in service. This line completes a loop with the original lines from Healy Falls to Peterboro, via Trenton and Port Hope, and thereby provides two sources of power to Brighton, Coborne, Cobourg, Port Hope, Millbrook and Peterboro; also, in a sense, to Newcastle, Bowmanville, Oshawa and Whitby, which receive power from the Port Hope-Oshawa line, and to Wellington and Picton, which receive power from the Trenton-Port Hope line. Lindsay, too, has benefited somewhat, although it has in Fenelon Falls a source of power which can supply a large part of its requirements. The usefulness of this line is not confined to periods of actual line trouble on other sections, as with the additional source of supply, maintenance work on the loop can be done without interruptions to customers, and at a minimum of expense, enabling all sections of line to be kept in better condition. The direct telephone line between Healy Falls and Auburn is of great benefit in system load despatching, as it provides a shorter and better transposed line between Belleville and Auburn. Previously telephone communication between the system operators at Belleville and Auburn generating station was carried on via Trenton and Port Hope with great difficulty, on account of the length and noisy condition of the line; but now the new line provides both an alternative connection in case of trouble and a shorter line over which, under normal conditions, conversation can be carried on without difficulty.

The Healy Falls-Peterboro line is 28 miles long, of wood wish-bone type construction, with 4/0 steel reinforced aluminum power conductors, and 3 strand No. 12 telephone cables. Sectionalizing switches have been installed at Norwood, where provision is made for serving a high-tension station which will supply both Norwood and Havelock, the latter by means of a 4,160-volt line.

Work on the reinsulation of the 44,000-volt lines, which was so actively carried on during the previous year, is now nearly completed. In fact, of the 92

miles of line which could not be done last year, 60 miles have now been completed, and 27 miles originally intended to be reinsulated have been deferred on account of the recent construction of the Healy Falls-Peterboro line, leaving only five miles to be done. The deferred section has given fairly satisfactory service, and since it is now a part of the new loop it can, in case of trouble, be disconnected without interfering with service to any customers.

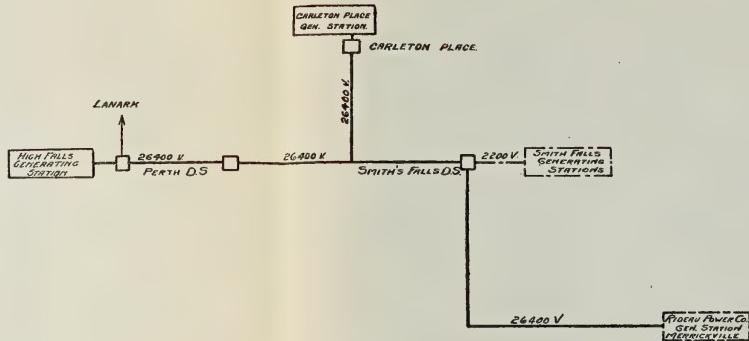
A station for the supply of power to Lakefield was placed in operation July 19th, together with a 6,600-volt line from Auburn Generating Station. The station is of outdoor type, with 3 outdoor single phase, 6,600 to 2,400-volt transformers of 75 k.v.a. capacity, the oil switches and metering equipment being located in a small adjacent building. Advantage of this line has been taken to serve the County House of Refuge, near Lakefield, by a short tap located near the town.

Coincident with the supply of power to Lakefield, a 6,600-volt 3-phase line from Healy Falls, to supply the Ontario Rock Company at Preneveau, was put into operation.

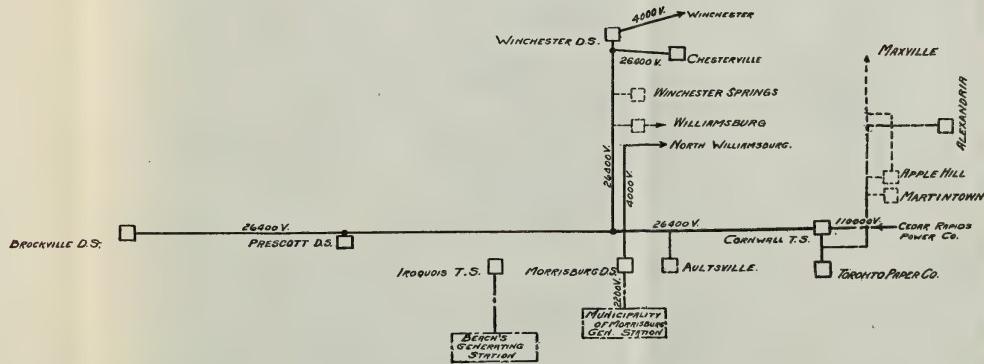
At Peterboro the possibility of prolonged interruptions to the street railway has been almost entirely eliminated by the installation of an auxiliary starting motor on the 100 k.w. synchronous motor generator set. Previously the railway equipment consisted of a 200 k.w. and a 100 k.w. synchronous motor generator set, and a 100 k.w. induction motor generator set, the latter being the only one which could be started from the A. C. side, and, consequently, if for any reason an interruption occurred on the A. C. side, the equipment could not be started without the induction motor generator set, whereas now, by means of the auxiliary starting motor, a duplicate means of starting has been provided.

An economy in starting motors has been made at the Oshawa synchronous condenser station, where a 35 h.p. and a 40 h.p. motor, formerly used for starting the synchronous condenser, have been replaced by a 75 h.p. motor, which is more satisfactory from an operating standpoint, and it sets free, for use elsewhere, equipment of greater value.

During the period from September 1st to October 17th there was a rather serious shortage of power on the Central Ontario System, due to an unusually low stream flow in the Trent River over which the Commission has no control, the Trent River being a regulated stream, and under the control of the Department of Railways and Canals of the Dominion Government at Ottawa. During the period of shortage the entire flow of the river was utilized to the utmost at all the Commission's plants, and every possible effort was made to obtain power from outside sources, such as the Quaker Oats Company, of Peterboro, who responded generously. The Campbellford town plant and Fenelon Falls town plant also gave what additional assistance they could. Unfortunately the utmost combined output of all these plants failed to meet the demand for power.



RIDEAU SYSTEM.



**HYDRO-ELECTRIC POWER COMMISSION
OF ONTARIO**

ST. LAWRENCE & RIDEAU SYSTEMS.

60 CYCLES.

APPROVED - 
CHIEF ENGINEER.

REVISIONS:-
OCT. 25-1917.
OCT. 25-1918.
OCT. 30-1919
OCT-30-1920

-KEY-

GENERATING STATION.

DISTRIBUTING STATION.

— STATIONS & LINES IN SERVICE.
- - - - STATIONS & LINES WHICH ARE NOT COMMISSION PROPERTY.
- - - - STATIONS & LINES UNDER CONSTRUCTION OR PROPOSED.

ST LAWRENCE SYSTEM.

Central Ontario System

COMPARISON OF MUNICIPAL LOADS—OCTOBER 1919-1920

Municipality	Peak Load in H.P., Oct., 1919	Peak Load in H.P., Oct., 1920	Increase
Belleville	1,434	1,689	255
Bloomfield	32	54	22
Bowmanville	1,162	1,206	44
Brighton	82	122	40
Brooklin Rural	117	134	17
Cobourg	643	804	161
Colborne	86	109	23
Deseronto	268	302	34
Kingston	1,710	1,707	—
Lakefield	—	161	161
Lindsay	1,247	1,158	—
Madoc	125	131	6
Millbrook	30	34	4
Napanee	338	374	36
Newcastle	27	37	10
Newburg	434	273	—
Omemee	24	40	16
Orono	27	37	10
Oshawa	2,890	3,307	417
Peterborough	3,320	3,950	630
Picton	205	295	90
Port Hope	410	405	—
Stirling	87	134	47
Trenton	529	593	64
Tweed	105	92	—
Wellington	71	87	16
Whitby	263	424	161

NOTE — Indicates a decrease.

Rideau System

The completion of the new generating station at High Falls, on the Mississippi River, has marked a new era in the operation of the Rideau system, and has, for the first time, enabled the Commission to supply the municipalities of Smith's Falls, Perth and Carleton Place with all the power they require. The station consists of three units, one of which is a single 875 k.v.a. generator direct connected to its turbine, and the other two consist of two 350 k.v.a. generators direct connected to opposite ends of the same turbine shaft. The first-mentioned unit went into service May 1st, and the other two on June 26th. Three 750 k.v.a. three-phase 4,160/26,400-volt transformers are used to step up from the bus voltage of approximately 4,600 volts to a line voltage of approximately 27,000 volts at which power is delivered to the High Falls-Perth line, which had previously been used to deliver power to High Falls for construction purposes. The station operates with a normal net head of 78 feet, and the general layout is simple and convenient for operation and presents throughout a very good appearance.

Situated, as it is, approximately eight miles from the nearest village, it was necessary to provide means of housing the operators. One cottage was built early in the construction period, so that it could be used by the Construction Staff, and it was then thought that further cottages would be built for the operators, but the excessively high prevailing prices made it desirable to defer further cot-

tages for a time. Some of the smaller buildings are at the disposal of the operators who require them, and an effort has been made to utilize local men for operation.

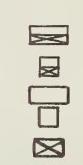
The partial failure of the power supply at Merrickville during the months of February and March, due to insufficient stream flow in the Rideau River, greatly aggravated the need for the High Falls Plant, and the completion, on May 31st, of the temporary arrangements to supply power to Carleton Place from the High-Tension System also called for additional power. Prior to May 31st the Commission's Generating Station at Carleton Place was the only source of power for that town, and it was quite insufficient to meet the needs. However, the three plants operating in parallel from May 31st were able to meet the system demands fairly well (due to the fortunate fact that the Rideau Power Company at Merrickville were temporarily able to supply more power than they were in February and March), pending the completion of the two remaining units at High Falls, which were made available June 26th. From this time onward the High Falls plant has been able to carry the entire system load without difficulty, and to the great satisfaction of all concerned. Smith's Falls benefited particularly, since they were able to discontinue the operation of the local hydraulic plants, and to give full service to all customers requiring power. It is curious to note that the second shortage of power at Merrickville set in immediately after the completion of the High Falls plant, and continued to the end of the year.

Operation of the Carleton Place plant was discontinued as soon as all units at High Falls were in service, and in order to provide for further growth in the system load, and for a standby for any possible contingencies, the hydraulic equipment in the Generating Station was thoroughly overhauled. The runners of both turbines had dropped about 2 inches, due to the wear on the old lignum vitæ thrust bearings. These were replaced, although the construction of the wheels made it exceedingly awkward to do so. It was also necessary to recognize the Crown gears, and to rebuild the concrete pedestal which supports the adjacent bearings of the two units, as excessive vibration had practically shaken these bearings to pieces. A number of other repairs of a general nature were made, and the wheels put in shape for operation when required.

The permanent equipment for the Distributing Station at Carleton Place was put into operation October 24th, the high-tension equipment being located in a part of the building which housed the generating equipment, and the low-tension switchboard being located on the generator floor of the generating station.

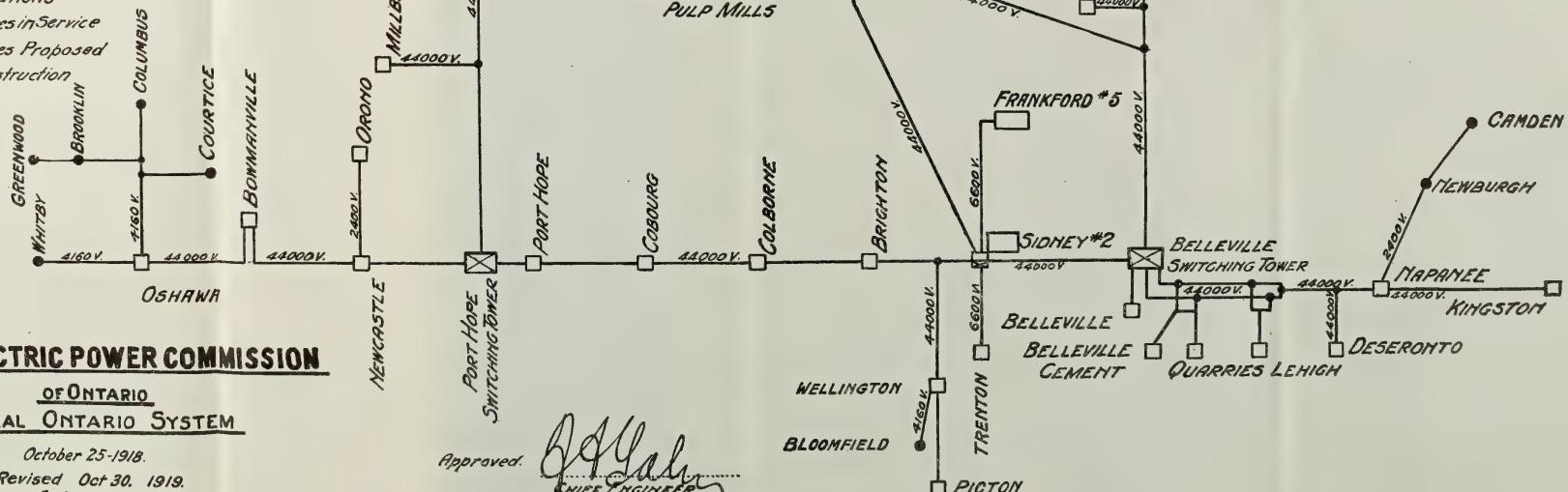
At Smith's Falls the installation of the permanent cooling water pump and motor has materially reduced the temperature of the transformers which, for several months, had been operating with a temporary and unsatisfactory cooling equipment, due to failure of manufacturers to make delivery of the permanent equipment.

Several little problems in connection with the parallel operation of the plants on the system have arisen and have been successfully met, and, taken altogether, the operation since the advent of High Falls has been very gratifying and shows a rapid increase in the system load, the depression in the load curve during the months of January, February, March and April being due to the partial failure of power supply at Merrickville.



KEY

- Power House & Switching Station
- Transformer House & Switching Station
- Power Houses
- Sub. Stations
- Switching Stations
- Stations & Lines in Service
- Stations & Lines Proposed or under Construction



HYDRO-ELECTRIC POWER COMMISSION

OF ONTARIO
CENTRAL ONTARIO SYSTEM

October 25-1918.

Revised Oct 30, 1919.

Oct. 30-1920

Approved.

[Signature]

CHIEF ENGINEER

Superseding C-154 of Oct 25-1917.

G-205

Rideau System

Municipality	Load in H.P. October, 1919	Load in H.P. October, 1920	Increase
Smith's Falls	450	1,052	602
Perth	342	558	216
Carleton Place	514	694	180

3

Nipissing System

The operation of the Nipissing System has been carried on very successfully during the past year with remarkably few interruptions to service, the increasing load being carried without any restrictions on the customers' demands.

The hydraulic plant generating power for this system is located on the South River about two miles from Nipissing Village, and in the past has been seriously affected by the extreme variation in the flow of the South River. The steam plant is located at North Bay, serving as a standby in emergencies, or as an auxiliary in case of shortage of power. During the low flow periods, it was usually necessary to operate this steam plant to assist the hydraulic plant in carrying the load of the system. In order to overcome this very undesirable condition, storage dams were erected at the outlet of a number of the lakes feeding the South River so that ample water could be stored and the flow in the river regulated to allow for more efficient operation of the Hydraulic Plant at Nipissing. The erection of these storage dams allowing more suitable control of the flow of the river has been a great benefit to this system. Although load was higher than last year it was not necessary to operate the steam plant this summer or fall with the exception of a short time when the hydraulic plant at Nipissing was shut down when the new trash racks were being installed at the headlock to replace the racks damaged by ice several years ago.

A new bridge was erected over the pipe line near the plant in order to transport the heavy equipment in connection with the proposed extension at this plant. Considerable maintenance work was carried out in connection with the wood stave pipe line and headlock controlling same.

The turbine equipment at this plant was overhauled and put in good operating condition.

Nipissing System

Municipality	Load in H.P. October, 1919	Load in H.P. October, 1920	Increase
North Bay	1,134	1,222	88
Powassan	97	84	—
Callander	39	40	1
Nipissing	3	3	—

41

Thunder Bay System

During the past year very satisfactory operation has been obtained on the Thunder Bay System. The Kaministiquia Power Company have maintained a very good standard of service. Due to the growth of the load taken by Port Arthur, it has been found necessary to increase the power held in reserve from the Kaministiquia Power Company from 6,000 to 7,000 horse-power.

Owing to the growth of the demand for power in certain sections of the city certain changes in the substation equipment would have been advisable, had it not been for the fact that power will be discontinued from the Kaministiquia Power Company shortly and the present equipment will be satisfactory under the new method of supplying power.

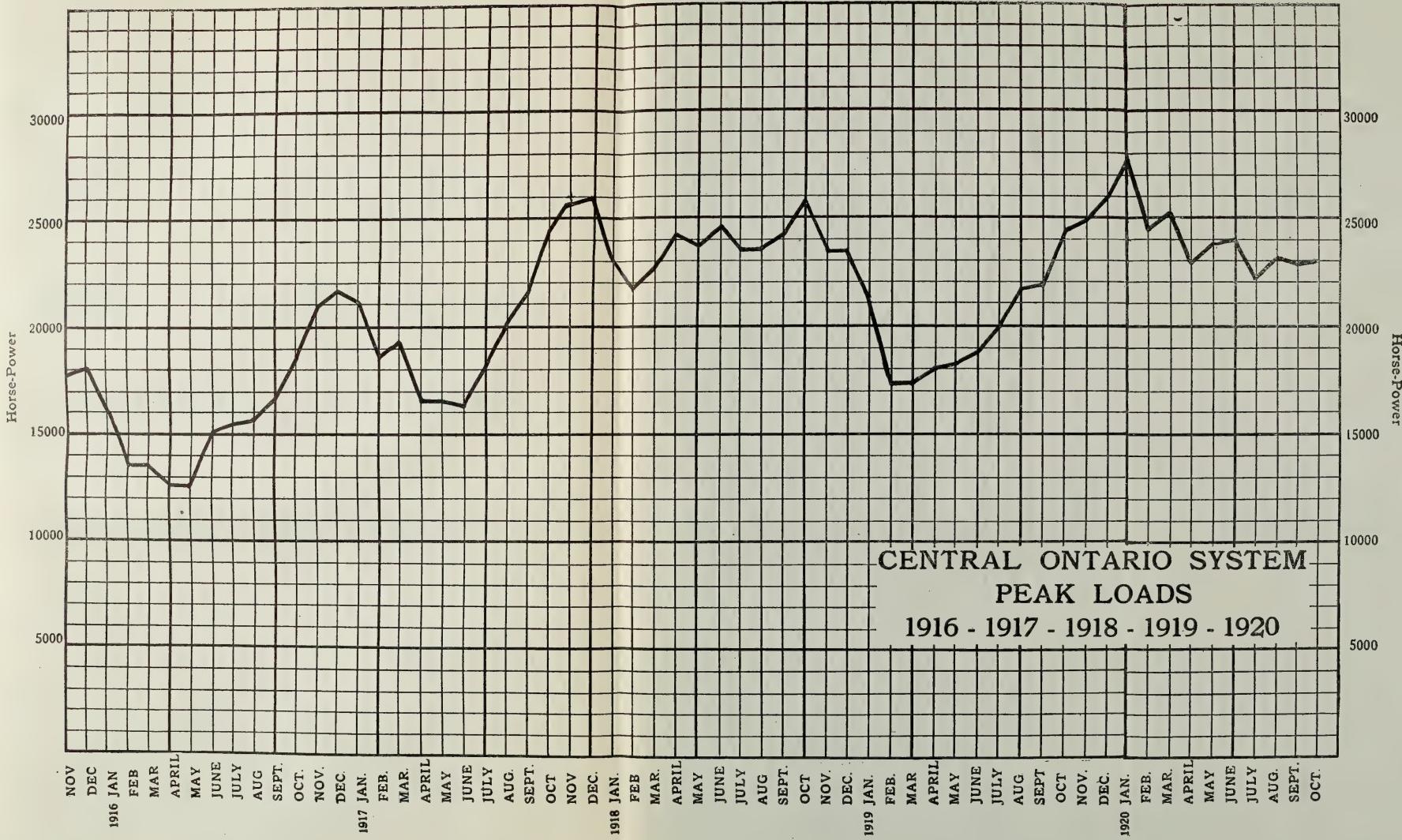
The equipment belonging to the Commission on this system has been maintained at the usual degree of high efficiency, the only new work at this station being the marked improvement made in the appearance of the station grounds.

Ottawa System

On the Ottawa System, the Ottawa and Hull Power & Manufacturing Company, who supply, through arrangements with this Commission, the Ottawa Hydro-Electric System, put into operation their new No. 2 Power House during the latter part of August. All power for Ottawa is now normally supplied from this generating station. The change-over from their No. 1 Power House to No. 2 Power House was affected without any interruption to service, the plants operating in parallel for a time, and No. 1 then being cut away. The old No. 1 Power House is still kept as a standby, or second source of supply, and service can be given from that station if necessary.

The Commission owns and maintains graphic metering equipment on the premises of the above company, for the purpose of checking amount of power supplied and load characteristics. Arrangements were made for the necessary alterations in this equipment to meet conditions arising out of the change-over from No. 1 Power House to No. 2 Power House.

The load on the Ottawa System shows some increase, the demand in October of this year being 7,640 horse-power, as compared with 7,450 horse-power in October of the previous year.



DETAILED STATEMENT OF ASSETS AND LIABILITIES—

31st OCTOBER, 1920

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

Detailed Statement of Assets and Liabilities—31st October, 1920

<i>Assets.</i>	<i>Liabilities.</i>
Niagara System:	
Right of Way	\$1,482,884 06
Steel Tower Lines	4,161,395 25
Transformer Stations	6,295,832 83
Wood Pole Lines	2,553,240 55
Rural Lines	<u>\$14,493,352 69</u>
	475,665 96
	<u>\$14,969,018 65</u>
Thunder Bay System:	
Power Development (Nipigon River)	\$3,547,732 46
Transmission Lines (Nipigon River)	452,129 34
Transformer Station (Port Arthur)	91,082 43
Transmission Line (Port Arthur)	29,476 46
Severn System:	
Power Development	\$649,767 39
Wood Pole Lines	552,256 60
Transformer Stations	179,250 45
St. Lawrence System:	
Wood Pole Lines	\$363,712 36
Transformer Stations	277,401 16
Rural Lines	<u>\$641,113 52</u>
	20 07
Wasdell's System:	
Power Development	\$141,760 06
Wood Pole Lines	153,690 29
Transformer Stations	26,215 08
Rural Lines	<u>\$321,665 43</u>
	11,281 72
	<u>332,947 15</u>
Provincial Treasurer:	
Cash Advances for Niagara and other System, Less Contra Account	\$31,779,316 10
Cash Advances for Niagara Power Development Works	22,360,000 00
Unexpended portion of the sum appropriated by the Legislature to cover Expenditures by the Commission on account of the Province	10,449 00
Bank of Montreal:	
Electric Railways	300,000 00
Cash Advances re Construction of Third Pipe Line on Ontario Power Company's property	1,200,000 00
Debentures issued to cover purchase of Capital Stock of Ontario Power Company of Niagara Falls	8,000,000 00
Debentures issued to cover purchase price of Essex System	226,000 00
Debentures issued to cover purchase price of Thorold System	100,000 00
Debentures issued to cover purchase price of capital stock of Sandwich, Windsor and Amherstburg Railway	2,039,000 00
Debentures assumed:	
Line to Brich Companies at Streetsville	\$4,765 76
Muskoka Power Development	43,907 47
Central Ontario System—due thereto:	<u>\$354,911 79</u>
Accounts Payable	
Bond Interest Coupons overdue but not presented	29,478 00
Insurance Department:	
Outstanding Claims and Awards	\$244,154 60
Surplus	<u>22,949 25</u>
	267,103 85

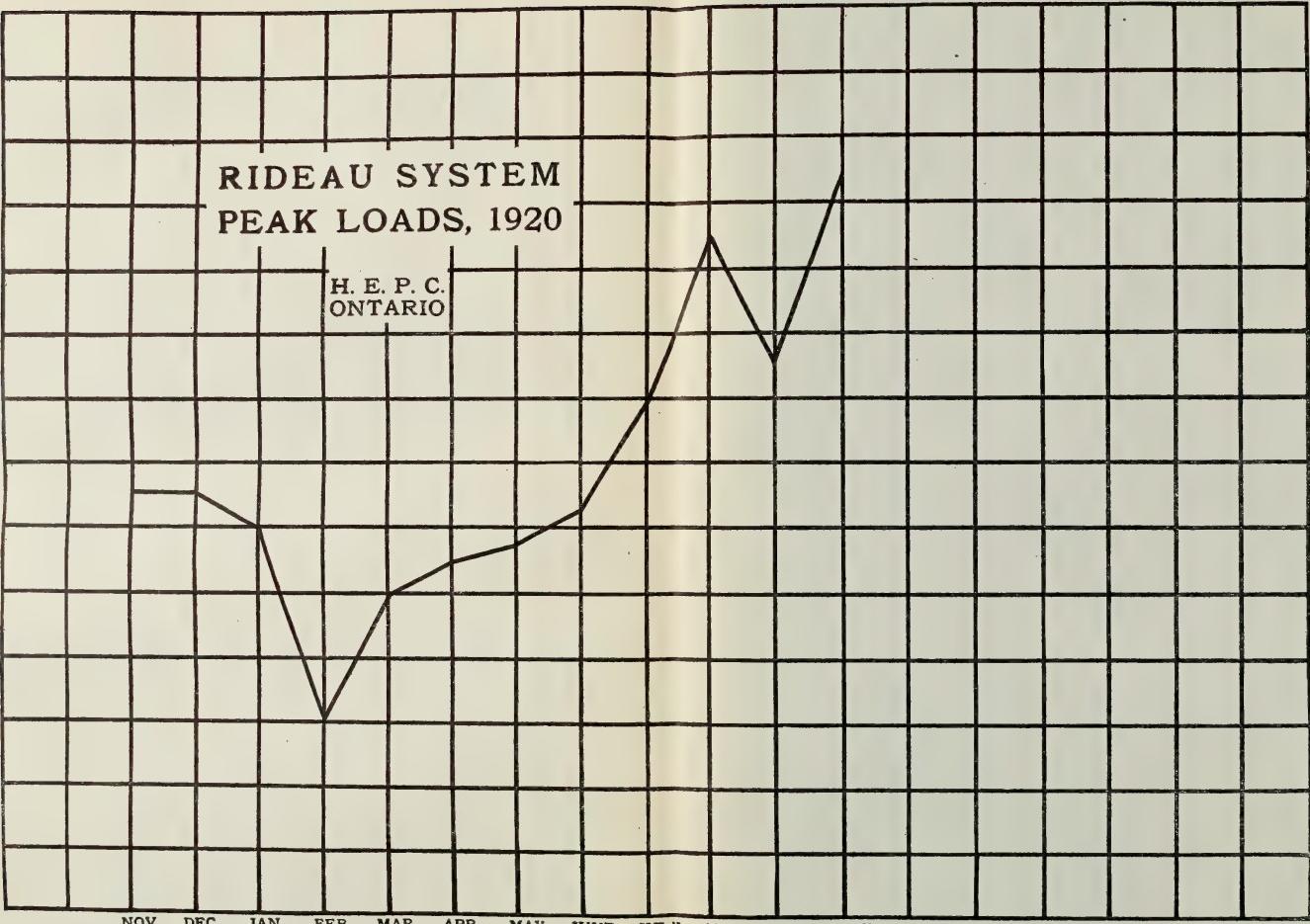
RIDEAU SYSTEM
PEAK LOADS, 1920

H. E. P. C.
ONTARIO

Horse-Power

2800
2400
2000
1600
1200
800
400

NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT.



RIBBON SYSTEM
PEAK LOADS 1920

RELATIVE
INTENSITY

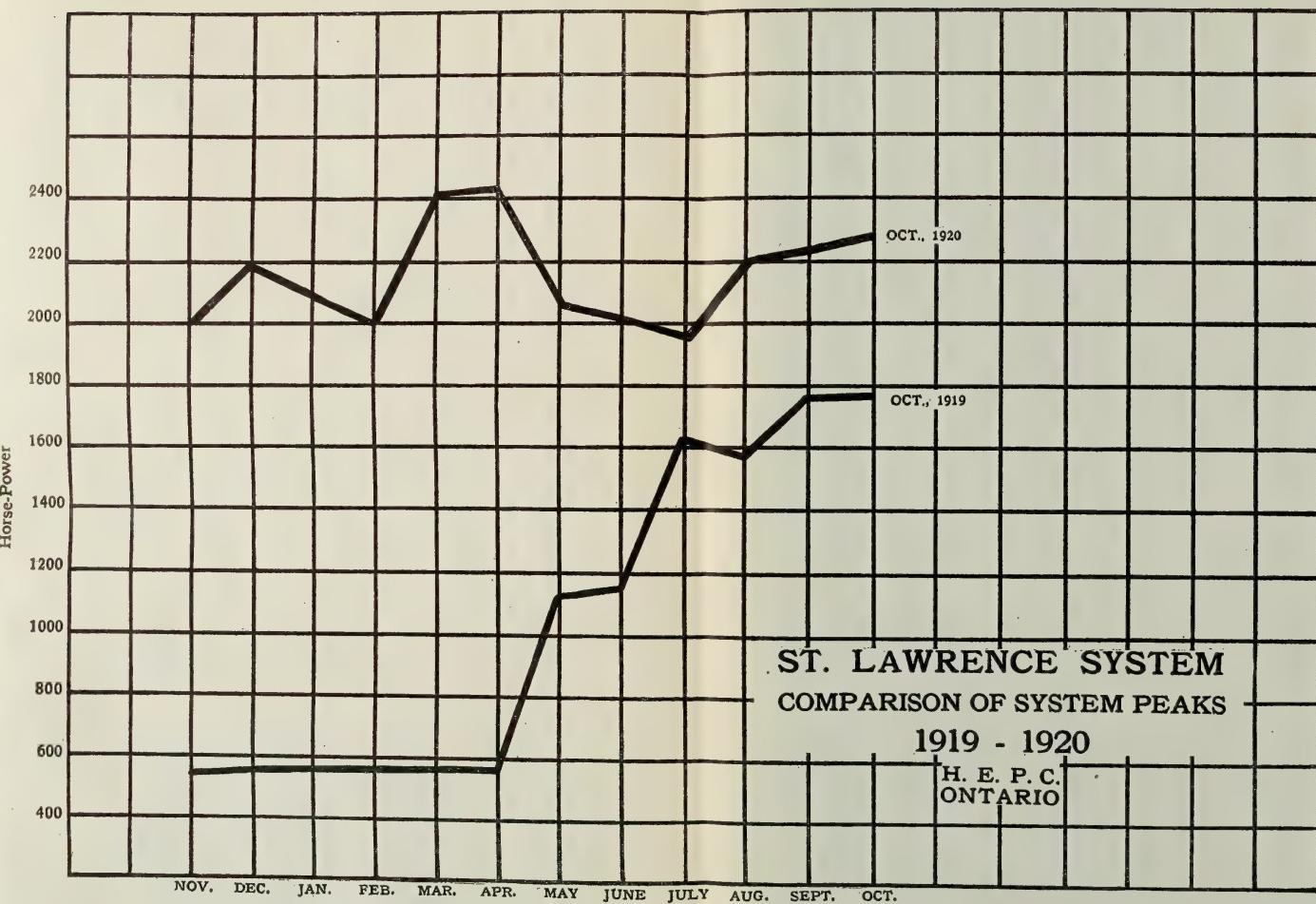


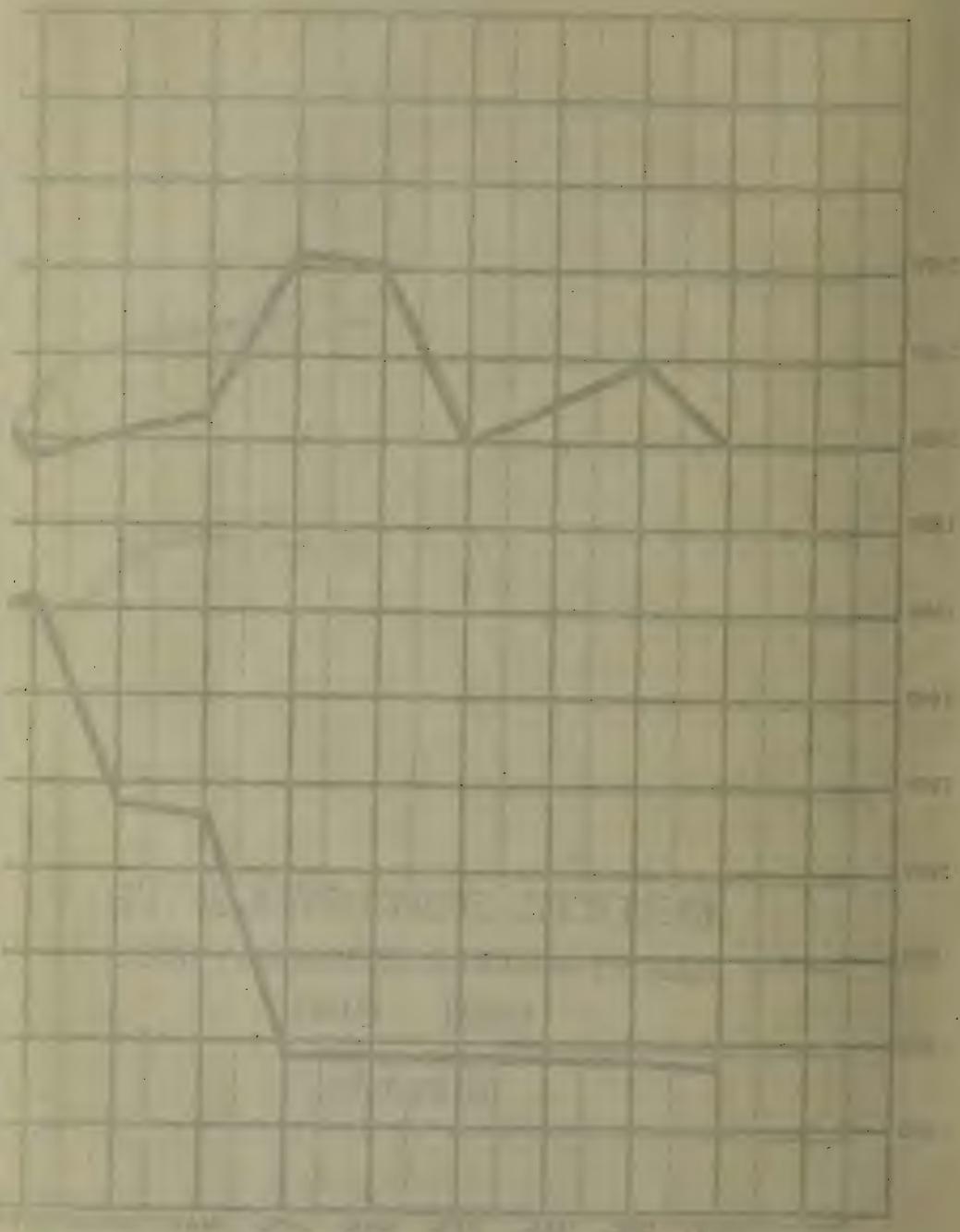
Eugenia System:				
Power Development	979,424	83		
Wood Pole Lines	727,460	81		
Transformer Stations	206,879	86		
	<u>\$1,913,765</u>	50		
Rural Lines	1,694	61	1,915,460	11
Ottawa System:				
Meters, etc.		1,009	57	
Muskoka System:				
Power Development	\$148,018	13		
Wood Pole Lines	54,313	44		
Transformer Stations	9,785	70	212,117	27
Rideau System:				
Power Development	\$718,941	41		
Wood Pole Lines	233,602	24		
Transformer Stations	49,844	27	1,032,387	92
Bonnechere River Storage System:				
Round Lake Dam	\$20,292	68		
Golden Lake Dam	11,092	81		
Interest on above to 31st December, 1916	2,780	25	34,165	74
Essex System:				
Purchase price of system	\$226,000	00		
Additional expenditure to date	149,516	68	375,516	68
Thorold System:				
Purchase price of System	\$100,000	00		
Less Credit Balance on Current Account	10,817	01	\$39,182	99
Niagara Power Development Works:				
Expenditure to date	26,846,896	22		
Shares of capital stock of Sandwich, Windsor and Amherstburg Railway	2,039,000	00		
Sandwich Windsor and Amherstburg Railway—current account	21,500	96		
Balances due to Municipalities in respect of amounts paid by them to 31st October, 1920 in excess of the cost of power supplied to them as provided to be paid under Section 23 of the Act:				
Niagara System	\$519,504	72		
Thunder Bay System	28,578	18		
Severn System	23,961	91		
Rideau System	5,214	13		
Reserves for Sinking Fund:				
Municipalities—				
Niagara System	\$715,912	36		
Niagara Rural Lines	46,809	11		
Thunder Bay System (Port Arthur)				
Severn System	20,446	98		
Wasdale System	39,341	52		
Wasdale Rural Lines	5,296	52		
Eugenia Rural Lines	376	71		
Ottawa System	105	83		
Bonnechere Storage System	67	73		
St. Lawrence System	2,480	06		
Service and Office Buildings:				
Office Buildings	\$40,098	09		
Service Buildings	32,046	61		
Reserves for Renewals:				
Contributed by Municipalities—				
Niagara System	\$1,837,262	87		
Niagara Rural Lines (Operated by Commission)	5,249	79		
Thunder Bay System	39,713	67		
Severn System	185,297	02		
St. Lawrence System	68,910	67		
Wasdale System	31,273	51		
Eugenia System	135,762	20		
Muskoka System	27,646	18		
Rideau System	21,822	21		
In respect of Service and Office Buildings:				
Service Building	67,929	23		
Office Building	7,249	33		
				2,352,938
				12
				75,178
				56

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

Detailed Statement of Assets and Liabilities—31st October, 1920—Continued

<i>Assets.</i>	<i>Liabilities.</i>
Electric Railway Construction:	Reserves for Contingencies:
Right of Way	Niagara System
Construction Material	Thunder Bay System
Surveying and Engineering Account	Severn System
276,669 31	St. Lawrence System
Service Building and Equipment, Toronto	Eugenia System
\$421,602 55	Muskoka System
Garage Building and Equipment, Niagara Falls	Rideau System
15,790 92	
Equipment, Storehouse and Garage, Hamilton	Surplus of Interest Account
9,356 19	Bond Interest Accrued
Pole Yard and Equipment, Cobourg	
19,557 91	Surplus arising from Departmental Operation in Service Building:
Office Building	Storehouse Surplus
	Machine Shop Surplus
Office Furniture and Equipment:	
At Toronto Office	29,181 72
At Hamilton Office	10,925 37
At Electrical Inspection Office	
Library	40,107 09
Stationery and Office Supplies	Contingent Liabilities—
26,597 71	In respect of contracts entered into for works under construction
Automobiles and Trucks	
	Debentures issued in respect of Sandwich, Windsor and Amherstburg Railway (Held by Bank of Montreal as collateral security) ..
Inventories:	
Construction and Maintenance, Tools and Equipment	Debentures issued (including \$1,200,000.00 held by Bank of Montreal as collateral security) in respect of Port Credit-St. Catharines Radial Railway
Construction Material and Sundry Supplies	
783,402 99	
Maintenance Material and Supplies	
221,712 58	
Farm Equipment, Produce, etc.:	
Equipment and Supplies	\$21,006 61
Live Stock and Produce	15,724 00
Expenditures on account 1921	
Crops	1,893 00
	38,623 61





Shares of Capital Stock on Ontario Power Company of Niagara Falls	8,000,000 00
Ontario Power Company of Niagara Falls:	
Expenditure in connection with Construction of Third Pipe	
Line	3,344,494 33
Current Account	173,178 55
	3,517,672 88
Sinking Fund Investment on deposit with Provincial Treasurer	475,000 00
Interest accrued to date	82,122 64
In Provincial Securities under Section 15 of the Act—par value \$38,500	37,445 10
	594,567 74
Investments:	
Debentures of the Hydro-Electric Power Commission purchased Issued in connection with the purchase of Capital Stock of the Ontario Power Company), par value \$115,000	79,844 50
Cash:	
In Banks	303,510 05
In hands of employees as advances on account of expenses	217,506 69
In bank to pay bond interest coupons overdue but not pre- sented	29,478 00
	550,494 74
Accounts Receivable:	
Due by Municipalities in respect of construction work and supply sales	320,556 21
Less reserve for doubtful accounts	4,288 65
	316,267 56
Due by Municipalities in respect of Power Accounts	725,930 46
“Sinking Fund and Interest” and “Consumers” Accounts owing in respect of Rural Lines	13,886 01

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

Detailed Statement of Assets and Liabilities—31st October, 1920—Continued

Assets.

Due by users of Water Power from Bonnechere Storage System	6,252 05
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Balance due by Municipalities in respect of the costs of Power supplied to them as provided to be paid under Section 23 of the Act:

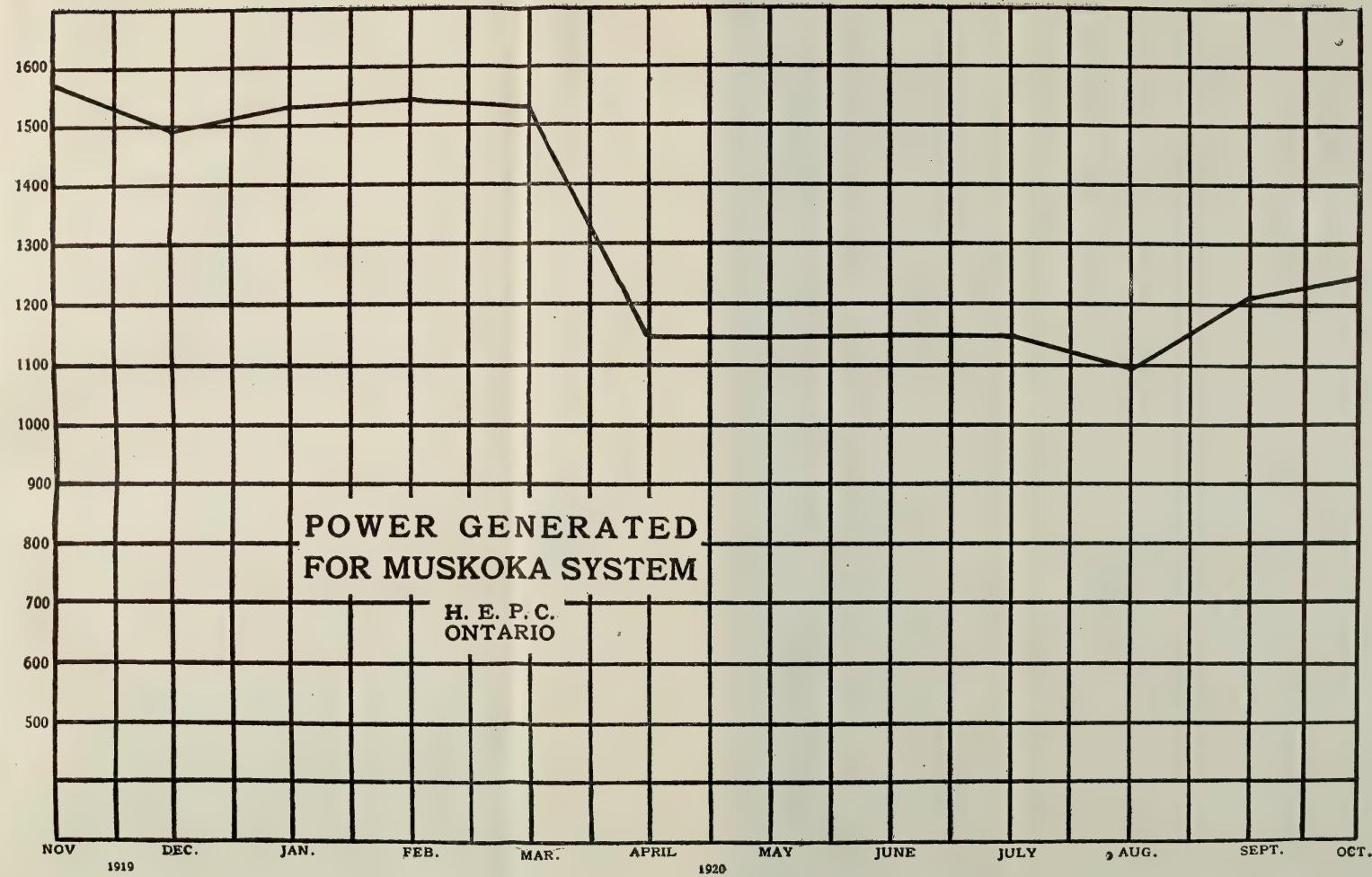
Niagara System	\$209,049 51
Severn System	40,713 72
St. Lawrence System	34,270 21
Wardell System	20,483 54
Eugenia System	76,877 72
Muskrat System	10,843 51
Rideau System	5,994 35
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Net deficit on Rural Lines operated by the Commission	\$398,232 56
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Work in Progress:
Expenditures chargeable upon completion to—

Sundry Municipalities	1,264 88
Capital Construction	74,872 08
Operating and Maintenance Expenses	7,592 61
Radial Railway Investigation	44,704 09
	<hr/>
Insurance Unexpired	128,433 66
	40,539 24
	<hr/>

	\$72,500,865 46
	<hr/>



POWER G
FOR MUSCLE

THE

100%

80%

60%

40%

20%

10%

5%

2%

1%

0%

NIAGARA SYSTEM

Operating Account for Year Ending 31st October, 1920.

Costs of operation as provided for under Secs. 6c and 23 of the Act:		Revenue for Period:	
Power Purchased	\$1,966,304 34	Collected from Municipalities	\$3,067,479 83
Cost of operating and maintaining Transmission Lines, Stations, etc., including the proportion of Administrative expenses chargeable to the operation of this system	585,098 63	Power sold to Private Companies Add amounts due by certain Municipalities, being the difference between sums paid and the costs of Power supplied to them in the year	570,904 84 \$224,258 63
Interest on Capital Investment..	644,859 37	Deduct amounts collected from certain Municipalities in excess of the sums required to be paid by them for power supplied in the year	
Provision for Renewal of Lines, Stations, etc.	310,519 12	111,577 62	112,681 01
Provision for Contingencies:		Revenue	\$3,751,065 68
By charges against Municipalities By charges against contracts with Private Companies which purchase power	\$32,360 68 5,139 32		
By appropriating the net profit on power sold to Private Companies	11,214 61	48,714 61	
Provision for Sinking Fund:			
By certain Municipalities which were charged therewith upon the expiry of their five-year exemption period	155,794 96		
By charges against contracts with Private Companies which purchased power	39,774 65	195,569 61	
			\$3,751,065 68

NIAGARA

Statement showing the Amount to be paid by each Municipality as the Cost under Section 23
sion from each Municipality on account of such cost—and the amount credited or charged to
it in the year ending

Municipality	Interim Rates per Horse Power Collected by Com- mission during year		Share of Capital Cost of System on which Interest and Fixed Charges are payable	Average Horse Power supplied in year after correction for power factor	Cost of Power to Commission	Share
	To Dec. 31, 1919	To Oct. 31, 1920				Operating Maintenance and Adminis- trative Expenses
Acton	35.00	32.00	23,207 86	175.3	1,889 27	1,151 81
Ailsa Craig	49.00	49.00	42,187 45	121.	1,664 06	1,086 11
Aylmer	38.00	38.00	51,266 47	154.9	1,669 40	1,624 96
Ayr	45.00	50.00	13,922 28	58.7	872 64	771 43
Baden	32.00	32.00	24,118 85	176.9	1,906 51	1,244 88
Beachville	27.00	27.00	30,839 39	260.8	2,810 73	2,207 97
Blenheim	50.00	50.00	36,793 38	122.6	1,321 30	1,865 21
Bolton	43.00	60.00	39,404 28	103.9	1,119 76	774 10
Bothwell	59.26	From Jun. 1 60.00	44,020 34	122.	1,314 84	1,670 42
Brampton	22.00	20.00	74,827 85	911.7	10,125 60	3,595 78
Brantford	18.00	18.00	244,263 66	3,789.2	41,287 56	13,070 46
Breslau.....	.....	.....	25,568 88	31.2	336 26	694 69
Brigden	57.50	57 50	32,183 86	81.4	877 28	1,124 27
Burford	60.00	70.00	15,282 34	36.5	393 37	916 13
Burgessville	48.00	48.00	6,537 21	22.4	241 41	398 25
Caledonia	24.00	24.00	6,560 37	69.1	744 71	243 08
Chatham	29.00	29.00	232,912 77	1,911.1	21,196 58	10,259 02
Chippawa	35.00	35.00	975 38	42.5	458 03	174 16
Clinton	43.00	43.00	46,064 00	171.7	1,850 47	1,667 31
Comber	60.00	60.00	30,880 39	84.9	915 00	1,111 59
Dashwood	56.00	56.00	20,825 02	46.9	505 46	497 32
Delaware	50.00	85.00	4,122 87	9.5	102 38	170 45
Dereham Twp.	37.00	37.00	7,842 64	56.7	611 07	785 31
Dorchester	50.00	50.00	4,839 53	23.2	250 04	316 29
Drayton	60.00	65.00	26,429 65	45.9	494 68	709 61
Dresden	42.00	38.00	34,771 07	211.9	2,283 72	1,723 56
Drumbo	45.00	60.00	3,576 78	18.1	195 07	183 59
Dublin	48.00	60.00	8,327 60	24.7	266 20	603 20
Dundas	14.00	14.00	43,159 62	1,153.3	12,429 51	2,437 64
Dunnville	27.77	35.00	86,519 69	236.9	2,553 15	1,191 24
Dutton	43.00	40.00	19,555 60	99.4	1,071 27	1,024 00
Elmira	38.00	38.00	38,223 01	199.2	2,746 84	1,334 03
Elora	40.00	40.00	39,212 62	195.1	2,102 66	1,270 64
Embro	60.00	75.00	18,095 48	42.	452 65	910 43
Etobicoke Twp.	27.00	27.00	22,154 18	274.6	2,959 46	1,232 44
Exeter	41.00	41.00	42,935 46	153.7	1,656 48	1,242 29
Fergus	40.00	40.00	32,391 69	149.1	1,606 90	1,481 96
Forest	63.00	63.00	46,584 21	110.	1,185 51	1,473 78
Galt	20.00	20.00	202,222 10	2,473.6	27,558 83	10,666 70
Georgetown.....	36.00	35.00	83,173 36	482.7	5,802 21	2,927 74
Glencoe.....	78.35	26,365 68	10.4	112 08	128 72	
Goderich	43.00	43.00	145,637 04	417.3	4,797 39	4,006 39
Granton	48.00	55.00	13,039 62	41.	441 87	629 42
Guelph	19.00	19.00	189,850 31	3,358.	38,290 29	13,247 73
Hagersville	34.00	36.00	37,916 76	229.6	2,474 47	1,395 86

SYSTEM

of the Act—of Power supplied to it by the Commission—the Amount received by the Commission each Municipality upon ascertaining by annual adjustment the actual cost of power supplied to October 31, 1920

of Operating Costs & Fixed Charges				Total Cost of Power for year as provided to be paid under Section 23 of Act	Amounts paid to Commission by each municipality	Amount credited or charged to each Municipality upon ascertaining the Cost of Power by Annual Adjustment		Sinking Fund for the years mentioned hereunder charged as part of the Cost of Power in the year 1919-1920
Interest	Renewals	Contingencies	Sinking Fund			Credited	Charged	
\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	
1,047 61	550 23	37 49	441 55	5,117 36	5,691 61	574 25	.....	1919
1,466 08	783 70	25 88	.....	5,025 83	6,290 93	1,265 10	.....	.....
2,330 87	1,247 55	33 13	.....	6,905 91	5,888 73	.....	1,017 18	.....
623 30	334 80	12 55	202 38	2,817 10	3,020 66	208 56	.....	1917
1,084 86	564 17	37 83	430 73	5,268 98	5,554 74	285 76	.....	1919
1,379 02	718 15	55 77	511 76	7,683 40	7,041 31	.....	642 09	1919
1,658 12	859 78	26 22	.....	5,730 63	6,048 61	317 98	.....	.....
1,788 04	952 03	22 22	.....	4,656 15	5,962 70	1,306 55	.....	.....
1,927 07	1,007 63	26 09	.....	5,946 05	7,013 37	1,067 32	.....	.....
3,409 20	1,613 74	194 99	1,233 50	20,172 81	20,244 69	71 88	.....	1920
10,426 63	5,251 89	810 40	2,781 47	73,628 41	68,656 92	.....	4,971 49	1917
1,164 51	634 21	6 67	464 60	3,300 94	2,393 92	.....	907 02	1919
1,459 03	767 41	17 41	.....	4,245 40	4,678 20	432 80	.....	.....
689 34	373 81	7 80	.....	2,380 45	2,481 41	100 96	.....	.....
290 12	155 90	4 79	.....	1,090 47	1,074 17	.....	16 30	.....
296 96	158 45	14 78	101 87	1,559 85	1,659 80	99 95	.....	1919
10,446 94	4,950 16	408 73	.....	47,261 43	56,234 88	8,973 45	.....	.....
44 43	24 39	.....	.....	701 01	1,488 93	787 92	.....	.....
2,072 47	1,091 65	36 72	607 48	7,326 10	6,949 18	.....	376 92	1917
1,374 41	719 53	18 16	.....	4,138 69	4,846 00	707 31	.....	.....
945 55	510 84	10 03	.....	2,469 20	2,530 59	161 39	.....	.....
187 66	101 35	2 03	.....	563 87	756 82	192 95	.....	.....
353 02	185 34	12 12	.....	1,946 86	1,865 08	.....	81 78	.....
220 07	116 77	4 96	67 33	975 46	1,162 07	186 61	.....	1917
1,201 86	647 37	9 81	.....	3,063 33	2,933 44	.....	129 89	.....
1,556 21	767 23	45 32	.....	6,376 04	7,770 32	1,394 28	.....	.....
159 58	85 33	3 87	122 56	750 00	981 75	231 75	.....	1917
378 25	201 02	5 28	.....	1,453 95	1,422 61	.....	31 34	.....
1,945 79	992 30	246 66	768 92	18,820 82	16,227 19	.....	2,593 63	1920
3,932 52	2,158 35	50 67	.....	9,885 93	7,951 61	.....	1,934 32	.....
878 54	461 81	21 26	.....	3,456 88	3,934 70	477 82	.....	.....
1,662 47	877 23	42 60	576 18	7,239 35	8,170 56	931 21	.....	1918
1,782 95	951 38	41 73	600 52	6,749 88	7,722 59	972 71	.....	1917
821 16	444 45	8 98	349 04	2,986 71	2,972 11	.....	14 60	1917
994 44	451 73	58 73	.....	5,696 80	7,414 64	1,717 84	.....	.....
1,945 87	1,041 37	32 87	.....	5,918 88	6,301 30	382 42	.....	.....
1,472 38	787 33	31 89	540 12	5,920 58	5,964 63	44 05	.....	1917
2,099 87	1,107 41	23 53	.....	5,890 10	6,890 78	1,000 68	.....	.....
9,200 32	4,659 01	529 03	3,635 39	56,249 28	54,473 23	.....	1,776 05	1920
3,773 40	2,003 75	103 24	1,296 90	15,907 24	17,432 44	1,525 20	.....	1918
245 57	130 50	2 22	.....	619 09	819 41	200 32	.....	.....
6,601 08	3,511 62	89 25	1,894 95	20,900 68	17,720 59	.....	3,180 09	1917
591 01	317 27	8 77	.....	1,988 34	2,210 71	222 37	.....	.....
8,636 64	4,272 23	718 18	3,412 95	68,578 02	65,903 33	.....	2,674 69	1920
1,718 87	928 34	49 10	532 10	7,098 74	7,992 70	893 96	.....	1918

NIAGARA

Statement showing the Amount to be paid by each Municipality as the Cost under Section 23 from each Municipality on account of such cost—and the amount credited or charged to supplied to it in the year

Municipality	Interim Rates per Horse Power Collected by Commission during year		Share of Capital Cost of System on which Interest and Fixed Charges are payable	Average Horse Power supplied in year after correction for power factor	Cost of Power to Commission	Share Operating Maintenance and Administrative Expenses
	To Dec. 31, 1919	To Oct. 31, 1920				
Hamilton	14.00	14.00	\$ 632,263 .87	17,415.5	\$ 195,192 .93	\$ 27,935 .34
Harriston	48.00	52.00	62,801 .97	233.5	2,516 .51	3,070 .03
Hensall	47.00	55.00	25,161 .37	55.4	597 .08	633 .74
Hespeler	21.00	21.00	34,055 .30	379.4	4,088 .93	1,802 .92
Highgate	51.00	51.00	16,808 .55	46.4	500 .07	724 .72
Ingersoll	23.00	21.00	90,732 .00	1,057.	11,391 .66	5,343 .61
Kitchener	19.00	19.00	386,675 .68	6,054.9	71,255 .74	21,086 .70
Lambeth	50.00	85.00	8,896 .73	20.5	220 .94	333 .78
Listowel	37.00	37.00	85,752 .47	440.4	5,346 .34	4,342 .89
London	19.00	19.00	748,411 .80	11,056.3	123,057 .64	35,014 .22
London and Port Stanley Rly....	{ 12.00+ 45c. per kwh	{ 15.00+ 1c. per kwh	{ 146,349 .08	1,197.5	12,905 .87	17,016 .96
Lucan	40.00	40.00	30,413 .88	181.8	1,959 .32	1,345 .97
Lynden	40.00	50.00	23,866 .56	92.9	1,001 .21	989 .22
Markham	77.74		21,379 .84	20.4	470 .51	45 .95
Milton	28.00	28.00	81,940 .11	720.7	8,247 .24	2,690 .81
Milverton	35.00	35.00	46,794 .05	284.3	3,364 .00	2,622 .54
Mimico	25.00	21.00	24,510 .01	303.8	3,274 .15	1,004 .89
Mitchell	36.00	36.00	30,589 .05	182.6	1,967 .94	1,558 .38
Moorefield	63.00	70.00	13,688 .20	26.5	285 .60	469 .31
Mt. Brydges	50.00	70.00	10,632 .65	24.5	264 .05	410 .70
New Hamburg	32.00	32.00	32,027 .31	221.4	2,386 .10	1,375 .41
New Toronto	25.00	20.00	345,739 .95	3,852.2	43,016 .49	17,379 .96
Niagara Falls	11.50	11.50	27,894 .52	3,091.7	33,500 .31	2,088 .80
Niagara-on-the-Lake	28.00	28.00	7,107 .59	165.8	1,786 .89	1,895 .46
Norwich	35.00	35.00	32,791 .25	226.9	2,445 .38	2,000 .05
Oil Springs	38.00	43.00	29,140 .11	113.2	1,220 .00	981 .53
Otterville	50.00	50.00	9,007 .30	34.8	375 .04	470 .20
Palmerston	45.00	50.00	29,700 .97	129.	1,390 .27	1,623 .99
Paris	20.00	19.00	48,781 .23	660.6	7,119 .51	2,700 .42
Parkhill.....		75.23	26,912 .87	22.2	239 .26	262 .28
Petrolia	36.00	36.00	78,874 .88	463.6	5,296 .38	3,596 .52
Petersburg and St. Agatha District			13,710 .35	19.5	210 .15	622 .51
Plattsville	60.00	65.00	26,075 .86	79.5	856 .80	894 .34
Port Credit	25.00	23.00	8,496 .50	90.4	974 .27	491 .26
Port Stanley	53.03	53.00	38,117 .60	165.4	1,782 .58	2,337 .44
Preston	19.00	19.00	105,765 .36	1,418.9	15,291 .97	5,769 .51
Princeton	70.00	85.00	7,779 .92	11.8	127 .17	216 .83
Ridgeway	47.00	47.00	39,694 .73	162.6	1,752 .39	1,998 .40
Rockwood	38.00	55.00	12,606 .80	50.4	543 .18	661 .21
Rodney	63.00	63.00	15,342 .87	53.2	573 .36	659 .83
St. George	45.00	45.00	15,699 .38	58.1	626 .17	476 .23
St. Jacobs	32.00	32.00	11,180 .95	68.3	736 .09	566 .71

SYSTEM—Continued

of the Act—of Power supplied to it by the Commission—the Amount Received by the Commission each Municipality upon ascertaining by annual adjustment the actual cost of Power ending October 31, 1920

of Operating Costs & Fixed Charges				Total Cost of Power for year as pro- vided to be paid under Section 23 of Act	Amounts paid to Commis- sion by each Muni- cipality	Amount credited or charged to each Mun- icipality upon ascer- taining the cost of power by Annual Adjustment		Sinking Fund for the years mentioned hereunder charged as part of the Cost of Power in the year 1919-1920
Interest	Renewals	Conting- encies	Sinking Fund			Credited	Charged	
28,495 66	14,497 42	3,724 79	11,260 64	281,106 78	256,050 15	.....	25,056 63	1920
2,850 33	1,502 06	49 94	.....	9,988 87	11,143 62	1,154 75	.....	.....
1,142 58	617 51	11 85	.....	3,002 76	2,985 65	.....	17 11	.....
1,549 54	790 56	81 14	612 33	8,925 42	8,370 85	.....	554 57	1920
75) 85	398 01	9 92	.....	2,392 57	2,364 81	.....	27 76	.....
4,054 52	2,068 38	226 06	1,602 23	24,686 46	23,660 68	.....	1,025 78	1920
17,585 61	8,582 13	1,294 98	6,949 31	126,754 47	122,730 47	.....	4,024 00	1920
404 92	218 69	4 38	.....	1,182 71	1,626 94	443 33	.....	.....
3,772 50	1,953 00	94 19	.....	15,508 92	16,721 34	1,212 42	.....	.....
33,922 78	16,703 88	2,364 69	13,405 27	224,468 48	213,970 95	.....	10,497 53	1920
6,612 17	3,383 64	256 11	2,546 90	42,721 65	40,919 60	.....	1,802 05	1917
1,372 25	721 67	38 88	.....	5,438 09	7,214 96	1,776 87	.....	.....
1,077 29	585 18	19 87	.....	3,672 77	4,387 22	714 45	.....	.....
568 08	311 81	.....	.....	1,396 35	1,587 82	191 47	.....	.....
3,727 83	1,842 54	154 14	913 96	17,576 46	20,313 66	2,737 20	.....	1918
2,110 32	1,082 37	60 80	.....	9,240 03	9,993 94	753 91	.....	.....
1,100 21	499 77	64 97	289 77	6,233 76	6,578 41	344 65	.....	1919
1,362 60	699 13	39 05	538 46	6,165 56	6,573 90	408 34	.....	1920
622 30	334 46	5 66	.....	1,717 33	1,820 60	103 33	.....	.....
483 92	261 36	5 24	.....	1,425 27	1,492 82	67 55	.....	.....
1,448 66	755 98	47 35	572 47	6,585 97	6,840 55	254 38	.....	1920
15,657 06	7,273 73	823 88	1,177 75	85,328 87	81,424 41	.....	3,904 46	1917
1,273 68	699 06	661 25	.....	38,223 08	35,734 47	.....	2,483 61	.....
313 58	172 11	35 46	.....	4,203 50	4,592 13	388 63	.....	.....
1,425 81	748 86	48 53	487 48	7,156 11	7,940 76	784 65	.....	1919
1,317 76	676 84	24 21	.....	4,220 34	4,504 08	283 74	.....	.....
398 91	213 78	7 44	.....	1,465 37	1,679 22	213 85	.....	.....
1,347 18	704 96	27 59	.....	5,093 99	6,356 36	1,262 37	.....	.....
2,100 01	1,070 51	141 28	424 14	13,555 87	12,662 28	.....	893 59	1917
703 96	382 52	4 75	.....	1,592 77	1,646 30	53 53	.....	.....
3,553 32	1,760 15	99 15	.....	14,305 52	16,990 96	2,685 44	.....	.....
622 99	338 42	4 17	254 46	2,052 70	1,360 77	.....	691 93	1919
1,173 07	633 96	17 00	461 85	4,037 02	5,087 71	1,050 69	.....	1917
377 69	181 78	19 33	98 21	2,142 54	2,111 55	.....	30 99	1918
1,715 06	907 40	35 37	624 20	7,402 05	8,766 11	1,364 06	.....	1919
4,811 35	2,416 67	303 46	1,901 30	30,494 26	27,059 16	.....	3,435 10	1920
352 21	191 84	2 52	186 96	1,077 53	867 73	.....	209 80	1917
1,787 81	914 56	34 77	.....	6,477 93	7,515 43	1,037 50	.....	.....
568 49	304 99	10 78	217 11	2,305 76	2,461 24	155 48	.....	1918
697 39	371 86	11 38	.....	2,313 82	3,348 85	1,035 03	.....	.....
704 37	379 38	12 42	.....	2,198 57	2,321 23	122 66	.....	.....
502 97	263 98	14 60	.....	2,084 35	2,186 39	102 04	.....	.....

NIAGARA

Statement showing the Amount to be Paid by each Municipality as the Cost under Section 23
mission from each Municipality on account of such cost—and the amount credited
of power supplied to it in the

Municipality	Interim Rates per Horse Power Collected by Commission during year		Share of Capital Cost of System on which Interest and Fixed Charges are payable	Average Horse Power supplied in year after correction for power factor	Cost of Power to Commission	Share Operating, Maintenance and Administrative Expenses
	To Dec. 31, 1919	To Oct. 31, 1920				
St. Mary's	28.00	28.00	\$ 83,744 48	623.8	\$ 6,722 91	\$ 5,649 87
St. Thomas	24.00	24.00	214,019 28	2,373.7	26,482 18	12,816 34
Sarnia	38.00	36.00	474,305 52	2,690.0	32,291 04	19,756 08
Seaforth	38.00	36.00	67,920 92	336.5	3,626 57	2,793 07
Scarboro Township	25.00		15,181 39	48.5	1,118 50	143 19
Simcoe	32.00	28.00	23,659 69	186.7	2,012 13	870 63
Springfield	65.00	65.00	11,630 04	30.3	326 56	632 53
Stamford Twp.	15.00	15.00	6,004 87	354.2	3,817 34	1,029 47
Stratford	25.00	25.00	190,818 72	1,766.1	19,993 86	11,042 32
Strathroy	42.00	40.00	73,335 67	329.	3,545 75	1,787 31
Streetsville			35,021 49	220.8	2,464 15	1,516 78
Tavistock	36.00	35.00	48,253 68	254.2	2,859 60	2,205 91
Thamesford	50.00	55.00	20,477 74	84.1	906 37	946 02
Thamesville	50.00	60.00	15,583 42	54.	581 98	741 06
Thorndale	50.00	60.00	19,562 31	72.2	778 12	1,150 97
Tilbury	45.00	50.00	21,267 24	91.	980 74	943 66
Tillsonburg	32.00	30.00	84,358 87	663.5	7,150 76	4,700 46
Toronto	14.50	14.50	3,106,915 33	56,620.3	619,216 40	90,080 78
Toronto Twp.	25.00	25.00	17,738 96	204.2	2,200 73	1,144 84
Walkerville	36.00	36.00	563,080 74	3,327.9	41,865 92	19,127 70
Wallaceburg	38.00	38.00	158,733 48	806.6	8,843 00	5,789 89
Waterdown	26.00	26.00	15,672 65	107.2	1,155 34	755 59
Watford	39.00	33.00	18,497 12	132.	1,422 61	883 88
Waterloo	21.00	20.00	79,498 94	1,185.2	12,773 31	4,351 74
Watford	65.00	85.00	39,397 07	57.	614 30	1,274 37
Welland	14.00	14.00	119,945 00	3,077.5	33,167 27	3,438 05
Wellesley	39.00	39.00	28,051 31	117.2	1,263 10	1,045 39
Weston	25.00	23.00	88,435 79	983.3	10,597 36	3,795 68
West Lorne	55.00	55.00	18,128 60	81.7	880 51	964 14
Windsor	36.00	36.00	547,957 18	3,240.8	38,407 21	19,328 98
Woodbridge	33.00	31.00	24,667 87	152.7	1,645 70	1,149 63
Woodstock	20.00	20.00	100,992 42	1,584.7	17,978 85	7,183 89
Wyoming	38.00	60.00	13,115 64	37.2	400 92	509 16
Zurich	69.00	60.00	30,795 46	61.	657 41	615 38
Totals—Municipalities			12,060,526 96		1,684,850 96	504,908 30
Totals—Companies			2,244,062 64		281,453 38	80,190 33
Non-operating Capital			188,763 09		.....	.....
Grand Total			14,493,352 69		1,966,304 34	585,098 63

SYSTEM—Continued

of the Act—of Power supplied to it by the Commission—the Amount received by the Com- or charged to each Municipality upon ascertaining by Annual Adjustment the actual cost year ending October 31, 1920

of Operating Costs & Fixed Charges				Total Cost of Power for year as pro- vided to be paid under Section 23 of Act	Amounts paid to Commis- sion by each Munici- pality	Amount credited or charged to each Munici- pality upon ascer- taining the Cost of Power by Annual Adjustment		Sinking Fund for the years mentioned hereunder charged as part of the Cost of Power in the year 1919-1920
Interest	Renewals	Conting- encies	Sinking Fund			Credited	Charged	
\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	
3,799 43	1,842 93	133 41	1,501 42	19,649 97	17,467 40	.....	2,182 57	1920
9,682 82	4,827 90	507 67	3,826 37	58,143 28	58,224 83	81 55	.....	1920
21,375 47	10,628 89	575 31	.....	84,626 79	101,025 29	16,398 50	.....	.....
3,063 50	1,591 58	71 97	1,210 61	12,357 30	12,242 70	.....	114 60	1920
403 37	221 37	.....	.....	1,886 43	1,213 32	.....	673 11	.....
1,027 65	540 83	39 93	.....	4,491 17	5,356 51	865 34	.....	.....
527 47	285 00	6 48	.....	1,778 04	1,857 35	79 31	.....	.....
273 87	150 31	75 75	.....	5,346 74	5,002 85	.....	343 89	.....
8,613 72	4,256 27	377 72	3,403 88	47,687 77	45,112 34	.....	2,575 43	1920
3,335 45	1,773 68	70 36	1,189 60	11,702 15	12,801 35	1,099 20	.....	1917
1,557 79	792 67	47 22	588 05	6,966 66	9,593 54	2,626 88	.....	1920
2,173 37	1,125 00	54 37	.....	8,418 25	9,065 03	646 78	.....	.....
931 46	496 66	17 98	258 81	3,557 30	4,541 28	983 98	.....	1917
705 24	364 92	11 55	.....	2,404 75	3,150 99	746 24	.....	.....
880 03	470 50	15 44	517 84	3,812 90	4,199 53	386 63	.....	1917
982 76	502 07	19 46	.....	3,428 69	4,379 07	950 38	.....	.....
3,783 66	1,978 14	141 90	1,495 19	19,250 11	19,396 74	146 63	.....	1920
141,683 16	58,211 55	12,109 61	46,964 50	968,266 00	829,994 45	.....	138,271 55	1920
794 05	378 17	43 67	219 13	4,780 59	5,030 40	249 81	.....	1918
25,550 65	11,742 86	711 74	13,787 19	112,786 06	126,172 52	13,386 46	.....	1917
6,340 95	3,149 48	172 51	.....	24,295 83	30,800 85	6,505 02	.....	.....
793 59	379 13	22 92	278 05	3,294 62	2,745 00	.....	549 62	1920
807 26	426 66	28 23	.....	3,568 64	4,226 25	657 61	.....	.....
3,615 81	1,775 15	253 49	1,428 87	24,198 37	23,962 57	.....	235 80	1920
1,789 66	958 88	12 19	.....	4,649 40	4,449 16	.....	200 24	.....
5,466 58	3,000 32	658 19	.....	45,730 41	43,084 92	.....	2,645 49	.....
1,268 63	675 58	25 06	.....	4,277 76	4,520 63	242 87	.....	.....
4,029 07	1,933 74	210 30	1,469 48	22,035 63	22,928 48	892 85	.....	1920
823 52	435 24	17 47	.....	3,120 88	4,280 36	1,159 48	.....	.....
24,864 23	11,425 82	693 11	10,485 14	105,204 49	120,649 36	15,444 87	.....	1917
1,113 58	568 08	32 66	302 32	4,811 97	4,740 81	.....	71 16	1917
4,482 80	2,225 09	338 92	1,771 47	33,981 02	32,593 15	.....	1,387 87	1920
594 32	310 95	7 96	.....	1,823 31	2,100 12	276 81	.....	.....
1,398 88	757 22	13 04	.....	3,441 93	3,759 68	317 75	.....	.....
543,155 88	259,090 06	32,360 68	155,794 96	3,180,160 84	3,067,479 83	111,577 62	224,258 63	.....
101,703 49	51,429 06	5,139 32	39,774 65	559,690 23	570,904 84	11,214 61	.....	.....
644,859 37	310,519 12	37,500 00	195,569 61	3,739,851 07	3,638,384 67	122,792 23	224,258 63	.....

NIAGARA SYSTEM

Reserve for Contingencies Account—31st October, 1920

Balance brought forward 31st October, 1919	\$15,762 48
Added during the year ending 31st October, 1920:	
Amount charged to Municipalities as part of the cost of power delivered to them	\$32,360 68
Provision against equipment employed in respect of contracts with sundry power customers	5,139 32
Net profits from contracts with sundry power customers applied to Reserve for Contingencies	11,214 61
Profits to October 31, 1919, on contracts with sundry power customers, not previously applied	16,104 00
Interest at 4% per annum on monthly balances at the credit of the account	1,510 10
	<hr/>
	66,328 71
	<hr/>
Deduct:	\$82,091 19
Expenditures to cover contingencies met with during the year ending 31st October, 1920	43,576 64
	<hr/>
Balance carried forward 31st October, 1920	\$38,514 55

NIAGARA SYSTEM

Reserve for Renewals Account—31st October, 1920

Total provision for Renewals to 31st October, 1919	1,623,123 16
Deduct expenditures to 31st October, 1919	130,009 70
	<hr/>
Balance brought forward 31st October, 1919	\$1,493,113 46
Added during the year ending 31st October, 1920:	
Amounts charged to Municipalities as part of the cost of power delivered to them	\$260,175 91
Provision against equipment employed in respect of contracts with sundry companies	50,343 21
Interest at 4% per annum on the monthly balances to the credit of the account	59,724 54
Renewals Reserve provided on second hand equipment purchased	435 59
	<hr/>
	370,679 25
	<hr/>
Expenditures during the year ending 31st October, 1920	\$1,863,792 71
	<hr/>
Balance carried forward 31st October, 1920	26,529 84
	<hr/>
	\$1,837,262 87

NIAGARA SYSTEM.

Statement Showing the Total Sinking Fund Requirements to be met by each Municipality.—Sinking Fund Requirements, Payment of which has been Deferred by the Commission under Section 23 of the Act. Sinking Fund Payments made by certain Municipalities which have been operating more than Five Years, and the Total of such Sinking Fund Payments, including Interest allowed thereon, to October 31, 1920.

NIAGARA

Statement Showing the Total Sinking Fund Requirements to be met by each Municipality.—
Section 23 of the Act. Sinking Fund Payments made by certain Municipalities which
including Interest Allowed thereon

Municipality	Total Sinking Fund Requirements Chargeable to the Municipality under the Act		Sinking Fund Requirements, of which has been	
	(a) For Period of	(b) Amount	(a) For Period of	
Acton	4 years ending Oct. 31, 1920	\$ 1,717 15	1 year ending Oct. 31, 1920	
Ailsa Craig	4 " " "	1,866 49	4 " " "	" "
Aylmer	3 " " "	2,398 01	3 " " "	" "
Ayr	4 " " "	923 72	3 " " "	" "
Baden	4 " " "	1,827 92	1 " " "	" "
Beachville	4 " " "	1,947 08	1 " " "	" "
Blenheim	4 " " "	2,688 72	4 " " "	" "
Bolton	4 " " "	2,755 29	4 " " "	" "
Bothwell	4 " " "	2,847 47	4 " " "	" "
Brampton	4 " " "	4,519 70	.....
Brantford	4 " " "	13,065 08	3 years ending Oct. 31, 1920	
Breslau Dist....	7 " " "	2,758 46	1 " " "	" "
Brigden	3 " " "	1,577 10	3 " " "	" "
Burford	4 " " "	1,124 86	4 " " "	" "
Burgessville	4 " " "	410 39	4 " " "	" "
Caledonia	4 " " "	442 81	1 " " "	" "
Chatham	4 " " "	14,398 18	4 " " "	" "
Chippawa Village.	2 " " "	20 48	2 " " "	" "
Clinton	4 " " "	2,734 21	3 " " "	" "
Comber	4 " " "	1,517 82	4 " " "	" "
Dashwood	4 " " "	1,351 81	4 " " "	" "
Delaware	4 " " "	295 88	4 " " "	" "
Dereham Twp.	2 " " "	169 07	2 " " "	" "
Dorchester	4 " " "	315 00	3 " " "	" "
Drayton	3 " " "	1,393 92	3 " " "	" "
Dresden	4 " " "	1,950 85	4 " " "	" "
Drumbo	4 " " "	374 41	3 " " "	" "
Dublin	4 " " "	488 56	4 " " "	" "
Dundas	4 " " "	3,809 96	.....
Dunville	3 " " "	3,520 70	3 years ending Oct. 31, 1920	
Dutton	4 " " "	1,345 93	4 " " "	" "
Elmira	4 " " "	2,465 05	2 " " "	" "
Elora	4 " " "	2,758 97	3 " " "	" "
Embro	4 " " "	1,292 90	3 " " "	" "
Etobicoke Twp.	4 " " "	915 64	4 " " "	" "
Exeter	4 " " "	4,851 26	4 " " "	" "
Fergus	4 " " "	2,177 54	3 " " "	" "
Forest	4 " " "	3,253 20	4 " " "	" "
Galt	4 " " "	14,096 61	.....
Georgetown	4 " " "	5,501 38	2 years ending Oct. 31, 1920	
Glencoe.....	1 " " "	97 04	1 " " "	" "
Goderich	4 " " "	9,225 29	3 " " "	" "
Granton	4 " " "	901 43	4 " " "	" "
Guelph.....	4 " " "	12,758 87	.....
Hagersville	4 " " "	2,352 44	2 years ending Oct. 31, 1920	
Hamilton	4 " " "	36,536 94	.....

SYSTEM

Sinking Fund Requirements, Payment of which, has been Deferred by the Commission under have been Operating more than Five Years and the Total of such Sinking Fund Payments to 31 October, 1920

the Payment Deferred	Sinking Fund Requirements Paid (or Charged) as Part of the Cost of Power	Interest at 4% per annum allowed on Sinking Fund Requirements which have been Paid	Total Sinking Fund Payments and Accumulated Interest to the credit of the Municipality on 31st October, 1920
(b) Amount	(a) For Period of	(b) Amount	
\$ c. 413 75	3 years ending Oct. 31, 1919.....	\$ c. 1,303 40	\$ c. 1,354 12
1,866 49	.....	50 72	.....
2,398 01	.....	.....	.....
721 34	1 year ending Oct. 31, 1917.....	202 38	202 38
428 71	3 " " " 1919.....	1,399 21	1,458 83
544 95	3 " " " 1919.....	1,402 13	1,454 17
2,688 72	.....	.....	.....
2,755 29	.....	.....	.....
2,847 47	.....	.....	.....
.....	4 years ending Oct. 31, 1920.....	4,519 70	4,792 85
10,283 61	1 " " " 1917.....	2,781 47	2,781 47
460 18	6 " " " 1919.....	2,298 28	2,613 98
1,577 10	.....	.....	.....
1,124 86	.....	.....	.....
410 39	.....	.....	.....
117 35	3 years ending Oct. 31, 1919.....	325 46	338 77
14,398 18	.....	.....	.....
20 48	.....	.....	.....
2,126 73	1 year ending Oct. 31, 1917.....	607 48	607 48
1,517 82	.....	.....	.....
1,351 81	.....	.....	.....
295 88	.....	.....	.....
169 07	.....	.....	.....
247 67	1 year ending Oct. 31, 1917.....	67 33	67 33
1,393 92	.....	.....	.....
1,950 85	.....	.....	.....
251 85	1 year ending Oct. 31, 1917.....	122 56	122 56
488 56	.....	.....	.....
.....	4 years ending Oct. 31, 1920.....	3,809 96	4,051 02
3,520 70	.....	.....	.....
1,345 93	.....	.....	.....
1,281 67	2 years ending Oct. 31, 1918.....	1,183 38	1,207 67
2,158 45	1 " " " 1917.....	600 52	600 52
943 86	1 " " " 1917.....	349 04	349 04
915 64	.....	.....	.....
4,851 26	.....	.....	.....
1,637 42	1 year ending Oct. 31, 1917.....	540 12	540 12
3,253 20	.....	.....	.....
.....	4 years ending Oct. 31, 1920.....	14,096 61	14,922 39
2,909 51	2 " " " 1918.....	2,591 87	2,643 67
97 04	.....	.....	.....
7,330 34	1 year ending Oct. 31, 1917.....	1,894 95	1,894 95
901 43	.....	.....	.....
.....	4 years ending Oct. 31, 1920.....	12,758 87	13,513 34
1,321 54	2 " " " 1918.....	1,030 90	1,050 85
4 " " " 1920.....	36,536 94	1,885 33	38,422 27

NIAGARA

Statement Showing the Total Sinking Fund Requirements to be met by each Municipality.—
Section 23 of the Act.—Sinking Fund Payments made by Certain Municipalities which
including Interest Allowed thereon

Municipality	Total Sinking Fund Requirements chargeable to the Municipality under the Act		Sinking Fund Requirements, of which has been
	(a) For Period of	(b) Amount	
		\$ c.	
Harriston	4 years ending Oct. 31, 1920	3,321 48	4 years ending Oct. 31, 1920
Hensall	4 " " "	2,285 46	4 " " "
Hespeler	4 " " "	2,248 22	.....
Highgate	4 " " "	1,306 99	4 years ending Oct. 31, 1920
Ingersoll	4 " " "	5,857 72	.....
Kitchener	4 " " "	23,969 69	.....
Lambeth	4 " " "	600 09	4 years ending Oct. 31, 1920
Listowel	4 " " "	4,446 72	4 " " "
London	4 " " "	48,771 06	.....
London and Pt. Stanley Ry....	4 " " "	10,368 64	3 years ending Oct. 31, 1920
Lucan	4 " " "	1,829 90	4 " " "
Lynden	4 " " "	1,790 18	4 " " "
Markham	1 " " "	205 61	1 " " "
Milton	4 " " "	4,248 07	2 " " "
Milverton	4 " " "	2,955 33	4 " " "
Mimico	4 " " "	1,249 57	1 " " "
Mitchell	4 " " "	2,090 85	.....
Moorefield	3 " " "	695 75	3 years ending Oct. 31, 1920
Mount Brydges ..	4 " " "	857 59	4 " " "
New Hamburg ..	4 " " "	2,205 45	.....
New Toronto ...	4 " " "	15,106 77	3 years ending Oct. 31, 1920
Niagara Falls ..	4 " " "	1,602 28	4 " " "
Niagara-on-the- Lake	2 " " "	206 35	2 " " "
Norwich	4 " " "	2,151 19	1 " " "
Oil Springs	3 " " "	1,292 86	3 " " "
Otterville	4 " " "	472 86	4 " " "
Palmerston	4 " " "	2,177 40	4 " " "
Paris	4 " " "	2,625 59	3 " " "
Parkhill	1 " " "	278 18	1 " " "
Petersburg and St. Agatha Dis..	5 " " "	956 66	1 " " "
Petrolia	4 " " "	6,032 54	4 " " "
Plattsburgh	4 " " "	1,834 99	3 " " "
Port Credit	4 " " "	431 87	1 " " "
Port Stanley	4 " " "	2,562 92	1 " " "
Preston	4 " " "	6,180 62	.....
Princeton	4 " " "	650 87	3 years ending Oct. 31, 1920
Ridgetown	4 " " "	2,815 72	4 " " "
Rockwood	4 " " "	829 49	2 " " "
Rodney	4 " " "	1,106 98	4 " " "
St. George	4 " " "	1,033 52	4 " " "
St. Jacobs	4 " " "	683 76	4 " " "
St. Mary's	4 " " "	5,041 73	.....

SYSTEM—Continued

Sinking Fund Requirements, Payment of which have been Deferred by the Commission under
have been Operating more than Five Years and the Total of such Sinking Fund Payments
to 31 October, 1920

the Payment Deferred	Sinking Fund Requirements (Paid or Charged) as Part of the Cost of Power		Interest at 4% per annum allowed on Sinking Fund Requirements which have been Paid	Total Sinking Fund Pay- ments and Accumulated Interest to the credit of the Municipality on 31st October, 1920
(b) Amount	(a) For Period of	(b) Amount		
\$ c.		\$ c.	\$ c.	\$ c.
3,321 48				
2,285 46				
1,306 99	4 years ending Oct. 31, 1920	2,248 22	132 27	2,380 49
600 09	4 years ending Oct. 31, 1920	5,857 72	348 00	6,205 72
4,446 72	4 " " " 1920	23,969 69	1,335 38	25,305 07
7,821 74	1 " " " 1917	2,546 90		2,546 90
1,829 90				
1,790 18				
205 61				
2,390 20	2 years ending Oct. 31, 1918	1,857 87	37 76	1,895 63
2,955 33				
386 35	3 years ending Oct. 31, 1919	863 22	34 63	897 85
695 75	4 " " " 1920	2,090 85	127 08	2,217 93
857 59				
13,929 02	4 years ending Oct. 31, 1920	2,205 45	130 84	2,336 29
1,602 28	1 " " " 1917	1,177 75		1,177 75
206 35				
563 44	3 years ending Oct. 31, 1919	1,587 75	68 74	1,656 49
1,292 86				
472 86				
2,177 40				
2,201 45	1 year ending Oct. 31, 1917	424 14		424 14
278 18				
246 19	4 years ending Oct. 31, 1919	710 47	50 69	761 16
6,032 54				
1,373 14	1 year ending Oct. 31, 1917	461 85		461 85
138 02	3 " " " 1919	293 85	11 81	305 66
677 74	3 " " " 1919	1,885 18	77 15	1,962 33
463 91	4 " " " 1920	6,180 62	333 80	6,514 42
2,815 72	1 " " " 1917	186 96		186 96
443 89	2 years ending Oct. 31, 1918	385 60	6 74	392 34
1,106 98				
1,033 52				
683 76	4 years ending Oct. 31, 1920	5,041 73	282 78	5,324 51

NIAGARA

Statement Showing the Total Sinking Fund Requirements to be met by each Municipality.—
Section 23 of the Act.—Sinking Fund Payments made by Certain Municipalities which
including Interest Allowed thereon

Municipality	Total Sinking Fund Requirements Chargeable to the Municipality under the Act		Sinking Fund Requirements, of which has been
	(a) For Period of	(b) Amount	
		\$ c.	
St. Thomas	4 years ending Oct. 31, 1920	15,014 99	
Sarnia	4 " " " "	27,871 00	4 years ending Oct. 31, 1920
Scarboro Twp....	1 " " " "	178 28	1 " " " "
Seaforth	4 " " " "	6,028 57	
Simcoe	4 " " " "	1,335 36	4 years ending Oct. 31, 1920
Springfield	4 " " " "	631 43	4 " " " "
Stamford Twp. .	4 " " " "	478 03	4 " " " "
Stratford	4 " " " "	12,727 71	
Strathroy	4 " " " "	5,074 80	3 years ending Oct. 31, 1920
Streetsville.....	1 " " " "	588 05	
Tavistock	4 " " " "	2,996 78	4 years ending Oct. 31, 1920
Thamesford	4 " " " "	1,355 98	3 " " " "
Thamesville	4 " " " "	1,233 82	4 " " " "
Thorndale	4 " " " "	1,692 32	3 " " " "
Tilbury	4 " " " "	1,903 97	4 " " " "
Tillsonburg	4 " " " "	5,569 10	
Toronto	4 " " " "	178,063 50	
Toronto Twp. ...	4 " " " "	962 96	2 years ending Oct. 31, 1920
Walkerville	4 " " " "	43,365 67	3 " " " "
Wallaceburg	4 " " " "	8,677 11	4 " " " "
Waterdown	4 " " " "	1,005 62	
Waterford	4 " " " "	1,313 00	4 years ending Oct. 31, 1920
Waterloo	4 " " " "	5,196 73	
Watford	4 " " " "	2,342 38	4 years ending Oct. 31, 1920
Welland	4 " " " "	8,141 81	4 " " " "
Wellesley	4 " " " "	1,961 49	4 " " " "
West Lorne	4 " " " "	833 35	4 " " " "
Weston	4 " " " "	4,930 50	
Windsor	4 " " " "	37,319 96	3 years ending Oct. 31, 1920
Woodbridge	4 " " " "	1,474 93	3 " " " "
Woodstock	4 " " " "	6,231 42	
Wyoming	4 " " " "	1,019 77	4 years ending Oct. 31, 1920
Zurich	4 " " " "	1,786 15	4 " " " "
Totals			
Municipalities		42,427 65	
Essex System..	2 " " " "	4,741 56	1 year ending Oct. 31, 1919
Companies		204,465 41	
	Grand Totals	51,634 62	

SYSTEM—Continued

Sinking Fund Requirements, Payment of which has been deferred by the Commission under have been Operating more than Five Years and the Total of such Sinking Fund Payments to October 31, 1920

the Payment Deferred	Sinking Fund Requirements Paid (or Charged) as Part of the Cost of Power		Interest at 4 % per annum allowed on Sinking Fund Requirements which have been Paid	Total Sinking Fund Payments and Accumulated Interest to the credit of the Municipality on 31st October 1920
	(b) Amount	(a) For Period of		
\$ c.		\$ c.	\$ c.	\$ c.
27,871 00	4 years ending Oct. 31, 1920.....	15,014 99	905 01	15,920 00
178 28				
1,335 36	4 years ending Oct. 31, 1920.....	6,028 57	410 38	6,438 95
631 43				
478 03				
3,885 20	4 years ending Oct. 31, 1920.....	12,727 71	775 83	13,503 54
1 " " " 1917.....	1,189 60			1,189 60
1 " " " 1920.....	588 05			588 05
2,996 78				
1,097 17	1 year ending Oct. 31, 1917.....	258 81		258 81
1,233 82				
1,174 48	1 year ending Oct. 31, 1917.....	517 84		517 84
1,903 97				
581 18	4 years ending Oct. 31, 1920.....	5,569 10	308 10	5,877 20
29,578 48	4 " " " 1920.....	178,063 50	10,180 03	188,243 53
8,677 11	2 " " " 1918.....	381 78	6 51	388 29
1,313 00	1 " " " 1917.....	13,787 19		13,787 19
2,342 38				
8,141 81				
1,961 49	4 years ending Oct. 31, 1920.....	1,005 62	58 13	1,063 75
833 35				
26,834 82	4 years ending Oct. 31, 1920.....	4,930 50	274 59	5,205 09
1,172 61	1 " " " 1917.....	10,485 14		10,485 14
1,019 77	1 " " " 1917.....	302 32		302 32
1,786 15	4 " " " 1920.....	6,231 42	366 28	6,597 70
280,979 34				
1,821 08	1 year ending Oct. 31, 1920.....	461,448 31	23,994 69	485,443 00
		2,920 48		2,920 48
		204,465 41	23,083 47	227,548 88
282,800 42		668,834 20	47,078 16	715,912 36

NIAGARA

Statement showing the Net Credit or Charge to each Municipality in respect of Power
ments Made and Interest Added during the Year; also the Amount Credited
Ending 31st October, 1920, and the Accumulated Amount standing

Municipality	Date Commenced Operating	Net Credit or Charge at 31st October, 1919	
		Credit	Charge
Acton	Jan., 1913	\$ 2,437 39	c.
Ailsa Craig	Jan., 1916	1,219 01	c.
Aylmer	Mar., 1918	.....	583 68
Ayr	Jan., 1915	.....	1,991 28
Baden	May, 1912	2,268 75	c.
Beachville	Aug., 1912	4,966 45	c.
Blenheim	Nov., 1915	.....	3,230 25
Bolton	Feb., 1915	.....	4,785 94
Bothwell	Sept., 1915	.....	3,987 14
Brampton	Nov., 1911	16,921 43	c.
Brantford	Feb., 1914	8,925 96	c.
Brigden	Jan., 1918	.....	1,382 91
Burford	June, 1915	.....	3,162 87
Burgessville	Nov., 1916	721 12	c.
Caledonia	Oct., 1912	300 04	c.
Chatham	Feb., 1915	1,670 51	c.
Clinton	Mar., 1914	.....	1,096 00
Comber	May, 1915	.....	4,466 34
Chippawa	Sept., 1919	.....	93 42
Dashwood	Sept., 1917	247 07	c.
Delaware	May, 1915	.....	436 33
Dereham Twp.	Sept., 1919	.....	224 84
Dorchester	Dec., 1914	652 49	c.
Drayton	Mar., 1918	.....	510 46
Dresden	April, 1915	.....	636 33
Drumbo	Dec., 1914	.....	953 79
Dublin	Oct., 1917	.....	395 88
Dundas	Jan., 1911	.....	1,055 87
Dunnville	June, 1918	.....	6,788 99
Dutton	Sept., 1915	.....	74 66
Elmira	Nov., 1913	355 80	c.
Elora	Nov., 1914	.....	1,055 42
Embro	Jan., 1915	.....	3,815 80
Etobicoke Twp.	Aug., 1917	2,083 36	c.
Exeter	June, 1916	.....	2,903 84
Fergus	Nov., 1914	.....	1,633 80
Forest	Mar., 1917	.....	361 01
Galt	May, 1911	28,200 74	c.
Glencoe	Aug., 1920	.....
Georgetown	Sept., 1913	1,929 61	c.
Goderich	Feb., 1914	.....	10,336 47
Granton	July, 1916	.....	347 69
Guelph	Dec., 1910	26,066 37	c.
Hagersville	Sept., 1913	.....	1,360 50
Hamilton	Feb., 1911	619 02	c.

SYSTEM

Supplied to it to 31st October, 1919—the Cash Received and Applied thereon, Adjusted or Charged to each Municipality in respect of Power Supplied in the Year as a Credit or Charge to each Municipality at 31st October, 1920

Cash Receipts and Payments on account of such Credits and Charges, also Adjustments made during the Year		Interest at 4% per annum added during the Year		Amount Credited or Charged in respect of Power Supplied in the Year Ending 31st October, 1920		Accumulated Amount standing at the Credit or Charge on 31st October, 1920	
Credited	Charged	Credited	Charged	Credited	Charged	Credit	Charge
\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
97 50		574 25		3,109 14			
48 76		1,265 10		2,532 87			
583 68				1,017 18		1,017 18	
723 21		68 38	203 56				1,132 89
		90 75	285 76			2,645 26	
		198 66		642 09	4,523 02		
1,024 00		96 03	317 98				1,984 30
		191 44	1,306 55				3,670 83
1,567 02		140 07	1,067 32				1,492 87
		676 86	71 88			17,670 17	
		357 04		4,971 49	4,311 51		
		55 32	432 80				1,005 43
		126 51	100 96				3,188 42
		28 85		16 30	733 67		
		12 00		99 95	411 99		
		66 82	8,973 45		10,710 78		
1,117 92		21 92		376 92			376 92
		178 65	707 31				3,937 68
		3 74	787 92			690 76	
		9 88	161 39			418 34	
		17 45	192 95				260 83
		8 99		81 78			315 61
510 46		26 10	186 61		865 20		
				129 89			129 89
		25 45	1,394 28			732 50	
100 00		37 08	231 75	31 34			659 12
		15 83		32 34			443 05
		42 23		2,593 63			3,691 73
2,062 26		271 56		1,934 32			6,932 61
74 66			477 82			477 82	
		14 23		931 21		1,301 24	
1,068 96			13 54	972 71		972 71	
763 15			138 09		14 60		3,205 34
		83 33		1,717 84		3,884 53	
2,977 15			73 31	382 42		382 42	
		65 35	44 05				1,655 10
		14 44	1,000 68			625 23	
		1,128 03		1,776 05	27,552 72		
			200 32			200 32	
		77 18		1,525 20		3,531 99	
5,335 97			286 69	3,180 09			8,467 28
			13 91	222 37			139 23
1,020 00		1,042 65		2,674 69	24,434 33		
			35 95	893 96		517 51	
		24 76		25,056 63			24,412 85

NIAGARA

Statement showing the Net Credit or Charge to each Municipality in respect of Powerments Made and Interest Added during the Year; also the Amount Credited Ending 31st October, 1920, and the Accumulated Amount standing

Municipality	Date Commenced Operating	Net Credit or Charge at 31st October, 1919	
		Credit	Charge
Harriston	July 1916	\$ c.	\$ c.
Hensall	Jan. 1917 .....	.....	4,426 38
Hespeler	Feb., 1911 .....	.....	1,589 06
Highgate	Dec., 1916 .....	.....	594 88
Ingersoll	May, 1911	12,252 82	.....
Kitchener	Jan., 1911	27,942 60	.....
Lambeth	April, 1915 .....	.....	873 90
Listowel	June, 1916	778 15	.....
London	Jan., 1911	106,334 71	.....
London and Port Stanley Railway	Aug., 1914 .....	.....	23,325 11
Lucan	Feb., 1915	2,601 88	.....
Lynden	Feb., 1915 .....	.....	3,205 52
Milton	April, 1913 .....	.....	662 97
Milverton	June, 1916	977 27	.....
Mimico	May, 1912	3,286 33	.....
Mitchell	Sept., 1911	1,708 89	.....
Moorefield	Mar., 1918 .....	.....	205 17
Mount Brydges	Mar., 1915 .....	.....	416 78
Markham	Apr., 1920 .....	.....
Niagara-on-the-Lake	Aug., 1919	47 72	.....
Niagara Falls	Dec., 1915	7,276 83	.....
New Hamburg	Mar., 1911 .....	.....	2,255 16
New Toronto	Feb., 1914	29,644 64	.....
Norwich	May 1912	2,003 65	.....
Oil Springs	Feb., 1918 .....	.....	514 79
Otterville	Feb., 1916	122 81	.....
Palmerston	July 1916 .....	.....	1,847 78
Paris	Feb., 1914	3,303 56	.....
Parkhill	May 1920 .....	.....
Petrolia	May 1916 .....	.....	2,707 59
Plattsville	Dec., 1914 .....	.....	4,330 51
Port Credit	Aug., 1912	1,753 99	.....
Port Stanley	Apr. 1912 .....	.....	491 60
Preston	Jan., 1911	15,913 87	.....
Princeton	Jan., 1915 .....	.....	1,528 63
Ridgetown	Dec., 1915	505 69	.....
Rockwood	Sep., 1913 .....	.....	1,543 92
Rodney	Feb., 1917	296 19	.....
St. George	Sep., 1915	58 44	.....
St. Jacobs	Sep., 1917	154 71	.....
St. Mary's	May 1911	1,688 37	.....
St. Thomas	Apr., 1911	24,718 14	.....
Sarnia	Dec., 1916	6,317 28	.....
Seaforth	Nov. 1911	7,956 19	.....
Scarboro Township	Aug., 1918 .....	.....

SYSTEM

Supplied to it to 31st October, 1919—the Cash Received and Applied thereon, Adjusted or Charged to each Municipality in respect of Power Supplied in the Year as a Credit or Charge to each Municipality at 31st October, 1920

Cash Receipts and Payments on account of such Credits and Charges, also Adjustments made during the Year		Interest at 4% per annum added during the Year		Amount Credited or Charged in respect of Power Supplied in the Year Ending 31st October, 1920		Accumulated Amount standing at the Credit or Charge on 31st October, 1920	
Credited	Charged	Credited	Charged	Credited	Charged	Credit	Charge
\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
1,149 06		177 06	41 65	1,154 75		17 11	554 57
594 88		212 78				27 76	4,977 75
		490 11				1,025 78	11,717 15
		1,117 70	34 96	443 33		4,024 00	25,036 30
	787 27	20 08		1,212 42			1,223 38
24,013 33		4,253 39				10,497 53	100,090 57
		688 22				1,802 05	1,802 05
		104 08		1,776 87			4,482 83
1,126 80		124 35	26 52	714 45	2,737 20		2,047 71
		39 09		753 91			1,770 27
		131 45		344 65			3,762 43
		68 36		408 34			2,185 59
205 17				103 33			103 33
402 19		9 43		67 55			43 53
				191 47			191 47
		1 91		388 63			438 26
		291 07			2,488 61	5,079 29	
1,089 23		71 23		254 38			982 78
		1,185 79				3,904 46	26,925 97
		80 15		784 65			2,868 45
			20 59	283 74			251 64
		4 91		213 85			341 57
			73 91	1,262 37			659 32
		132 14				893 59	2,542 11
				53 53			53 53
			108 30	2,685 44			130 45
2,000 00		137 03		1,050 69			1,416 85
	70 16				30 99	1,793 16	
457 55		11 13		1,364 06			1,318 88
		636 55				3,435 10	13,115 32
750 00			57 08		209 80		1,045 51
	505 69			1,037 50			1,037 50
		61 76		155 48			1,450 20
		11 85		1,035 03			1,343 07
		2 34		122 66			183 44
	42 05	5 60		102 04			220 30
		67 53			2,182 57		426 67
		988 73		81 55			25,788 42
177 37		255 84		16,398 50			23,148 99
		318 25				114 60	8,159 84
						673 11	673 11

NIAGARA

Statement showing the Net Credit or Charge to each Municipality in respect of Powerments Made and Interest Added during the Year; also the Amount Credited Ending 31st October, 1920, and the Accumulated Amount standing

Municipality	Date Commenced Operating	Net Credit or Charge at 31st October, 1919	
		Credit	Charge
Simcoe	Apr., 1915	\$ 3,479 07	c.
Springfield	Aug., 1917	337 96	.....
Stamford Township	Nov., 1916	3,555 12	.....
Stratford	Jan., 1911	25,401 19	.....
Strathroy	Dec., 1914	8,664 40	.....
Streetsville	Nov., 1916	3,666 36	.....
Tavistock	Feb., 1914	.....	1,496 05
Thamesford	Oct., 1915	.....	2,025 13
Thamesville	Mar., 1914	.....	1,288 82
Thorndale .....	.....	.....	.....
Tilbury	Apr., 1915	.....	5,258 98
Tillsonburg	Aug., 1911	3,129 01	.....
Toronto	June 1911	27,435 97	.....
Toronto Twp.	Aug., 1913	706 34	.....
Walkerville	Nov., 1914	6,146 63	.....
Wallaceburg	Feb., 1915	.....	2,159 69
Waterdown	Nov., 1911	.....	1,289 17
Waterford	Apr., 1915	2,662 20	.....
Waterloo	Dec., 1910	8,763 88	.....
Watford	Sep., 1917	.....	3,867 35
Welland	Sep., 1917	9,448 82	.....
Wellesley	Nov., 1916	1,074 97	.....
West Lorne	Jan., 1917	381 82	.....
Weston	Aug., 1911	8,986 87	.....
Windsor	Oct., 1914	.....	11,127 54
Woodbridge	Dec., 1914	244 68	.....
Woodstock	Jan., 1911	19,020 65	.....
Wyoming	Nov., 1916	.....	2,107 67
Zurich	Sep., 1917	1,293 03	.....
Breslau District	Dec., 1913	.....	2,425 27
Petersburg and St. Agatha District	Sep., 1913	.....	510 91
H. E. P. C. Service Building .....	.....	.....	.....
		496,948 36	141,747 84

SYSTEM

Supplied to it to 31st October, 1919—the Cash Received and Applied thereon, Adjusted or Charged to each Municipality in respect of Power Supplied in the Year as a Credit or Charge to each Municipality at 31st October, 1920

Cash Receipts and Payments on account of such Credits and Charges, also Adjustments made during the Year		Interest at 4% per annum added during the Year		Amount Credited or Charged in respect of Power Supplied in the Year Ending 31st October, 1920		Accumulated Amount standing at the Credit or Charge on 31st October, 1920	
Credited	Charged	Credited	Charged	Credited	Charged	Credit	Charge
\$ c.	\$. c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
139 16		865 34		4,483 57			
13 52		79 31		430 79			
142 20				343 89		3,353 43	
1,016 05				2,575 43		23,841 81	
346 58		1,099 20				10,110 18	
		2,626 88				2,626 88	
	146 65	646 78				4,459 79	
750 00		46 44				191 49	
75 77		80 15					1,283 27
		51 55					953 74
619 55		199 18		950 38			3,888 23
		125 16		146 63		3,400 80	
	1,097 44			138,271 55			109,738 14
		28 25				984 40	
		245 86		13,386 46		19,778 95	
		86 39		6,505 02		4,258 94	
1,289 17				549 62			549 62
		106 49		657 61		3,426 30	
		350 56				235 80	8,878 64
1,022 90		136 97				200 24	
							3,181 66
	282 59	385 80				2,645 49	6,906 54
		43 00					1,360 84
		15 27		1,159 48			1,556 57
	122 48	359 47					10,116 71
				892 85			3,872 23
		445 10		15,444 87			
		9 79				71 16	183 31
		760 83				1,387 87	18,393 61
							1,915 17
		84 31		276 81			
		51 72		317 75			1,662 50
				97 01			3,429 30
				20 44			
						691 93	1,223 28
54,651 41	1,740 08	19,857 06	4,832 69	111,577 62	224,258 63	519,504 72	209,049 51

NIAGARA RURAL LINES

Operating Account for Year Ending 31st October, 1920

<i>Costs of operation as provided for under Sections 6 C and 23 of the Act:</i>	<i>Revenue for Period:</i>
Power Purchased:	
To supply customers on lines operated by the Commission	\$2,442 94
To supply the City of St. Catharines and others.....	58,804 88
	61,247 82
Costs of operating and maintaining Transmission Lines, etc., including the proportion of Administrative expenses chargeable to the operation of the lines operated by the Commission	1,019 60
Interest on Capital Investment	23,794 02
Provision for renewal of lines, etc. (only those operated by the Commission)	811 76
Provision for Sinking Fund	8,894 24
	\$95,767 44
	<hr/>
	\$95,767 44

NIAGARA RURAL LINES.

Statement showing "Cost of Power," "Operating Expenses," "Fixed Charges," and "Revenue," and the Net "Surplus" or "Deficit" on each Line for the year ending October 31, 1920.

NIAGARA

Statement showing "Cost of Power," "Operating Expenses," "Fixed Charges" the year ending

Lines Operated by	Capital Cost	Cost of Power to Commission	Operation, Maintenance and Administration Expenses	Interest
Ancaster Township	\$ 5,159 03	\$	\$	\$ 257 96
Bolton	2,110 45	\$	\$	105 52
Bothwell	6,571 84	\$	\$	355 88
Brampton	588 87	\$	\$	29 44
Chatham	898 18	\$	\$	44 90
Dereham Township	29,243 50	\$	\$	1,483 42
Elora	777 82	\$	\$	38 90
Etobicoke	54,608 68	\$	\$	2,984 10
Georgetown	8,889 59	\$	\$	444 48
Goderich	2,313 36	\$	\$	115 66
Lucan	333 26	\$	\$	16 66
Milton	813 82	\$	\$	40 70
Norwich	32,978 23	\$	\$	1,673 26
Preston	9,155 08	\$	\$	457 76
St. Thomas	1,933 82	\$	\$	96 20
Scarboro Township	26,125 24	469 40	186 60	1,928 29
Springfield	4,561 39	\$	\$	234 93
Stratford	4,058 47	\$	\$	202 92
Toronto	41,167 92	\$	\$	2,058 40
Toronto Township	43,309 37	\$	\$	2,165 46
Vaughan Township	21,592 88	\$	\$	1,209 96
Walkerville	41,148 83	\$	\$	1,981 30
Waterdown	11,825 24	\$	\$	591 26
Waterford	3,399 87	\$	\$	181 82
Waterloo	5,062 60	\$	\$	230 60
Weston	5,234 46	\$	\$	209 38
Windsor	8,767 56	\$	\$	422 58
Woodstock	1,088 20	\$	\$	54 42
Welland	30,136 86	4,368 59	\$	1,506 83
St. Catharines	7,500 00	50,327 28	107 44	300 00
Grantham Township	28,289 47	482 24	17 51	1,429 13
Louth Township	2,771 19	\$	\$	138 56
Port Colborne.....	\$	3,157 37	121 87	\$
Lines Operated by the Hydro-Electric Power Commission of Ontario:				
Don Mills Road	9,861 42	374 87	387 00	395 36
Brady & Raymond	817 18	\$	1 60	32 67
Wm. Pullen	74 15	\$	\$	2 96
Innes, Karn & Longworth	2,875 20	\$	50 26	115 01
W. G. Bailey	599 21	\$	\$	28 97
Port Dalhousie	5,834 33	2,068 07	147 32	233 37
Non-operating Capital	13,189 39	\$	\$	\$
Totals	475,665 96	61,247 82	1,019 60	23,794 02

RURAL LINES

and "Revenue," and the Net "Surplus" or "Deficit" on each Line for October 31, 1920

Fixed Charges		Total Cost of Power, Operating Expenses, Fixed Charges and Interest	Revenue from Municipalities	Net Surplus or Deficit for Year	
Renewals	Sinking Fund			Surplus	Deficit
\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
92 86		350 82	350 82		
37 98		143 50	143 50		
547 44		903 32	903 32		
10 60		40 04	40 04		
16 16		61 06	61 06		
526 36		2,009 78	2,009 78		
14 00		52 90	52 90		
982 96		3,967 06	3,967 06		
160 00		604 48	604 48		
41 64		157 30	157 30		
6 00		22 66	22 66		
14 64		55 34	55 34		
602 38		2,275 64	2,275 64		
164 80		622 56	622 56		
34 64		130 84	130 84		
8 42	592 57	3,185 28	3,194 81	9 53	
105 49		340 42	340 42		
73 04		275 96	275 96		
741 02		2,799 42	2,799 42		
779 56		2,945 02	2,945 02		
388 68		1,598 64	1,598 64		
723 09		2,704 39	2,704 39		
212 86		804 12	804 12		
65 46		247 28	247 28		
91 14		321 74	321 74		
94 22		303 60	303 60		
152 12		574 70	574 70		
19 58		74 00	74 00		
542 46		6,417 88	6,445 25	27 37	
135 00		50,869 72	50,896 57	26 85	
514 50		2,443 38	2,449 92	6 54	
49 88		188 44	188 44		
		3,279 24	3,400 25	121 01	
				191 30	
395 36	177 51	1,730 10	972 67		757 43
32 67	14 71	81 65	113 40	31 75	
2 96	1 33	7 25	96 00	88 75	
115 01	51 75	332 03	411 80	79 77	
23 97	10 79	58 73	120 78	62 05	
233 37	105 02	2,787 15	2,807 31	20 16	
811 76	8,894 24	95,767 44	95,483 79	473 78	757 43

Surpluses placed to credit of Municipalities \$191 30

Net deficit on lines operated by the Commission 474 95

NIAGARA RURAL LINES

Reserve for Renewals Account—31st October, 1920

Total provision for Renewals to 31st October, 1919	\$4,946 78
Deduct expenditures to 31st October, 1919	673 10
<hr/>	
Amounts added during year ending 31st October, 1920:	
Amounts charged Municipalities on lines operated by the Commission as part of the cost of power delivered to them	811 76
Interest at 4% per annum on the monthly balances to the credit of the account	170 95
	<hr/>
	982 71
<hr/>	
Expenditures during the year ending 31st October, 1920	\$5,256 39
	6 60
<hr/>	
Balance carried forward 31st October, 1920	\$5,249 79

NIAGARA RURAL LINES.

Statement showing the Total Sinking Fund Requirements on each Line—all of which have been paid—and the Total of such Sinking Fund Payments, with interest allowed thereon, to October 31, 1920.

NIAGARA

Statement showing the Total Sinking Fund Requirements on each line—
with interest allowed thereon

Lines operated by	Sinking Fund Requirements			
	Period Covered			Amount
Ancaster Twp.	7 yrs. ending 31st Oct., 1920, inclusive	"	"	\$ 635 45
Baden	8	"	"	157 34
Bolton	6	"	"	161 93
Bothwell	5	"	"	1,755 05
Brampton	3	"	"	33 56
Chatham	5	"	"	77 74
Dereham Twp.	3	"	"	1,454 53
Elora	7	"	"	83 91
Etobicoke	5	"	"	2,857 72
Georgetown	7	"	"	944 99
Goderich	7	"	"	266 62
Grantham Twp.	6	"	"	2,695 18
London Abattoir	7	"	"	60 94
Louth Twp.	2	"	"	99 76
Lucan	1	"	"	6 00
Milton	7	"	"	88 56
Mimico	8	"	"	921 33
New Toronto	7	"	"	168 28
Norwich	8	"	"	3,175 97
Port Dalhousie	9	"	"	693 36
Preston	8	"	"	1,241 22
St. Catharines	7	"	"	888 75
St. Thomas	7	"	"	207 77
Scarboro Twp.	3	"	"	1,466 31
South Dorchester Twp.	4	"	"	100 06
Springfield	1	"	"	105 49
Stratford	8	"	"	504 73
Thamesford	6	"	"	6 32
Thorndale	7	"	"	5 57
Toronto	8	"	"	4,439 51
Toronto Twp.	8	"	"	4,488 22
Vaughan Twp.	6	"	"	1,063 87
Walkerville	6	"	"	3,366 23
Waterdown	7	"	"	1,298 94
Waterford	6	"	"	219 74
Waterloo	7	"	"	422 18
Welland	8	"	"	3,539 06
Weston	7	"	"	800 42
Windsor	5	"	"	646 52
Woodstock	8	"	"	124 62
<i>Lines Operated by the Commission.</i>				
Don Mills Road	7	"	"	1,012 98
Brady & Raymond	7	"	"	108 34
W. Pullen	7	"	"	8 37
Innes, Karn & Longworth	8	"	"	393 29
Bailey's Farm	7	"	"	64 71
				42,861 44

RURAL LINES

all of which have been paid—and the Total of such Sinking Fund Payments to 31st October, 1920

Sinking Fund Paid		Interest at 4% per annum allowed on Sinking Fund Payments	Total Sinking Fund payments and accumulated interest to 31st October, 1920
Period Covered	Amount		
Full period	\$ c.	\$ c.	\$ c.
"	635 45	92 03	727 48
"	157 34	37 36	194 70
"	161 93	12 72	174 65
"	1,755 05	83 55	1,838 60
"	33 56	1 87	35 43
"	77 74	6 20	83 94
"	1,454 53	55 43	1,509 96
"	83 91	8 84	92 75
"	2,857 72	113 23	2,970 95
"	944 99	102 40	1,047 39
"	266 62	30 01	296 63
"	2,695 18	247 46	2,942 64
"	60 94	10 35	71 29
"	99 76	4 32	104 08
"	6 00	.....	6 00
"	88 56	9 32	97 88
"	921 33	169 89	1,091 22
"	168 28	28 74	197 02
"	3,175 97	29 $\frac{1}{2}$ 89	3,470 81
"	693 36	8 $\frac{1}{2}$ 11	761 77
"	1,241 22	171 31	1,412 53
"	828 75	106 34	995 09
"	207 77	21 90	229 67
"	1,466 31	42 10	1,508 41
"	100 06	6 18	106 24
"	105 49	.....	105 49
"	504 73	63 88	568 61
"	6 32	1 21	7 53
"	5 57	90	6 47
"	4,439 51	475 34	4,914 85
"	4,488 22	480 49	4,968 71
"	1,063 87	38 30	1,102 17
"	3,366 23	279 33	3,645 56
"	1,298 94	142 83	1,441 77
"	219 74	10 86	230 60
"	422 18	35 75	457 93
"	3,539 06	380 38	3,919 44
"	800 42	98 35	898 77
"	646 52	42 25	688 77
"	124 62	14 40	139 02
"	1,012 98	94 99	1,107 97
"	108 34	12 03	120 37
"	8 37	84	9 21
"	393 29	44 41	437 70
"	64 71	6 33	71 04
.....	42,861 44	3,947 67	46,809 11

NIAGARA

**Statement Showing the Surplus or Deficit on each Line at 31st October,
Year ending 31st October, 1920, and the Net**

Municipality	Date Commenced Operation	Surplus or Deficit at October 31, 1919	
		Surplus	Deficit
Grantham Twp.....	May, 1915	\$ c.	\$ c.
St. Catharines	Apr., 1914	.....	8 90
Scarboro Township.....	Aug., 1918	.....	25 82
Welland.....	Mar., 1913	27 08	9 17
Port Colborne.....	Mar., 1920	.....	.....
 Lines Operated by Commission:			
Don Mills Road.....	Nov., 1914	.....	3,474 58
Brady & Raymond.....	Oct., 1914	237 33	.....
Wm. Pullen	May, 1914	546 80	.....
Innes, Karn & Longworth.....	Feb., 1913	373 12	.....
W. G. Bailey	Oct., 1914	89 83	.....
Port Dalhousie	Nov., 1912	119 42	.....
		1,393 58	3,518 47

RURAL LINES

1919, and Interest added during the year; also the Surplus or Deficit for the Surplus or Deficit at 31st October, 1920

Interest on Surplus or Deficit at 4% per annum added during the year		Surplus or Deficit for the year ending 31st October, 1920		Net Surplus or Deficit on October 31, 1920	
Credited	Charged	Surplus	Deficit	Surplus	Deficit
\$.c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
.....	36	6 54	.....	.....	2 72
.....	1 03	26 85	.....	.....	.....
.....	36	9 53	.....	.....	.....
1 08	.....	27 37	.....	55 53	.....
.....	.....	121 01	.....	121 01	.....
				176 54	2 72
.....	138 98	.....	757 43	.....	4,370 99
9 49	.....	31 75	.....	278 57	.....
21 87	.....	88 75	.....	657 42	.....
14 92	.....	79 77	.....	467 81	.....
3 59	.....	62 05	.....	155 47	.....
4 78	.....	20 16	.....	144 36	.....
55 73	140 73	473 78	757 43	1,880 17	4,373 71
Balances owing to municipalities				\$176 54	
" " by "				2 72	
Net deficit to 31st October, 1920, on lines operated by the Commission....				\$173 82	
				2,667 36	

SEVERN SYSTEM

Operating Account for Year Ending 31st October, 1920

Cost of operation as provided for under Sections 6 C and 23 of the Act.

	<i>Revenue for Period.</i>
Power Purchased from Eugenia and Wastell Systems	\$12,852 91
Costs of operating and maintaining the Generating Plant, Transmission Lines, Stations, etc., including the proportion of Administrative Expenses chargeable to the operation of this System	59,959 65
Interest on Capital Investment.....	62,755 00
Provisions for Renewal of Generating Plant, Lines and Stations, etc.....	37,883 05
Provisions for Contingencies	1,423 13
Provisions for Sinking Fund by charges against Municipalities	\$13,646 12
By charge against contracts with Private Companies which purchased power	2,793 09
	<hr/>
	\$16,439 21
	<hr/>
Collected from Municipalities	\$154,538 63
Power sold to Private Companies	125,345 64
Add amounts due by certain Municipalities being the difference between sums paid and the Costs of Power supplied to them in the period.....	\$17,637 29
Deduct amounts collected from certain Municipalities in excess of the sums required to be paid by them for power supplied in the period	6,228 61
	<hr/>
Revenue	\$11,408 68
	<hr/>
	\$191,292 95
	<hr/>
	<hr/>

SEVERN SYSTEM.

Statement showing the Amount to be paid by each Municipality as the Cost under Section 23 of the Act—of Power supplied to it by the Commission—the Amount received by the Commission from each Municipality on account of such Cost—and the amount credited or charged to each Municipality upon ascertaining by annual adjustment the cost of Power supplied to it, in the year ending October 31, 1920.

SEVERN

Statement showing the Amount to be paid by each Municipality as the Cost under Section
Commission from each Municipality on account of such Cost—and the amount
the cost of Power supplied to it, in

Municipality	Interim Rates per Horse Power Collected by Commission during Year		Share of Capital Cost of System on which Interest and fixed Charges are Payable	Average Horse Power Supplied in Year after Correction for Power Factor	Cost of Power Purchased from Eugenia and Wasdell Systems	Share of Operating and Fixed		
	To Jan. 1/20	To Oct. 31/20				Operating, Maintenance and Administrative Expenses	Interest	Renewals
Alliston.....	\$ 40 00	\$ 50 00	\$ 80,482 68	132.	\$ 298 03	\$ 2,642 17	\$ 3,614 02	\$ 2,181 66
Barrie.....	29 00	29 00	138,014 41	665.8	1,503 23	6,647 89	6,265 34	3,782 18
Beeton.....	45 00	85 00	64,702 44	88.3	199 36	1,948 33	2,944 34	1,777 40
Bradford.....	47 00	75 00	52,992 02	41.	92 57	1,364 19	2,411 45	1,455 70
Coldwater.....	40 00	50 00	16,373 35	56.8	128 24	677 56	745 36	449 95
Collingwood....	28 00	28 00	323,451 85	1,336.9	3,018 47	17,394 53	14,708 85	8,879 24
Cookstown	35 00	60 00	26,538 56	61.1	137 95	1,092 73	1,206 88	728 55
Creemore	60 00	65 00	23,313 03	46.1	104 08	1,084 66	1,058 46	638 96
Elmvale	31 00	37 00	29,582 69	141.2	318 80	1,491 07	1,340 10	808 97
Midland	20 00	28 00	208,910 07	1,112.5	2,511 79	8,013 76	9,498 41	5,733 87
Penetang.....	22 00	32 00	157,890 48	839.9	1,896 31	6,334 57	7,185 65	4,337 74
Port McNicoll..	35 00	85 00	9,071 10	33.9	76 54	867 38	412 93	249 27
Stayner.....	35 00	40 00	31,149 91	120.	270 93	1,685 84	1,409 92	851 10
Thornton.....	43 00	85 00	10,996 55	11.1	25 06	370 04	500 53	302 15
Tottenham.....	51 00	85 00	32,050 83	28.4	64 12	1,121 35	1,459 00	880 75
Victoria H'rbour	35 00	50 00	13,502 43	48.9	110 40	843 32	614 68	371 06
Waubaushene..	30 00	45 00	6,846 94	24.8	55 99	307 87	310 24	187 28
Totals—								
Municipalities			1,225,869 34		10,811 87	53,887 24	55,686 16	33,615 83
Companies			155,361 80		2,041 04	6,052 41	7,068 84	4,267 22
Non-Operating Capital.....			43 30					
Grand Total			1,381,274 44		12,852 91	59,939 65	62,755 00	37,883 05

SYSTEM

23 of the Act—of Power supplied to it by the Commission—the Amount received by the credited or charged to each Municipality upon ascertaining by annual adjustment the year ending 31st October, 1920.

Costs Charges	Sinking Fund	Total Cost of Power for year as Provided to be Paid under Sec- tion 23 of Act	Amount Paid by Municipal- ties to Commis- sion in re- spect of Power Supplied in Year	Profit from Sale of Power to Com- panies Credited to Munici- palities in propor- tion to their Mainten- ance costs	Total Revenue from each Munici- pality	Amount Credited or Charged to each Municipality upon ascertaining the Cost of Power by Annual Adjustment		Sinking Fund for the years mentioned hereunder charged as part of the Cost of Power in the year 1919-1920
						Credited	Charged	
\$ c. 33 00		8,768 88	6,508 68	195 50	6,704 18	.....	2,064 70	.....
166 45	1,377 66	19,742 75	19,309 40	409 92	19,719 32	.....	23 43	1917-18
22 07		6,891 50	6,542 11	150 30	6,692 41	.....	199 09	.....
10 25		5,334 16	2,883 72	110 00	2,993 72	.....	2,340 44	.....
14 20	204 36	2,219 67	2,544 75	30 52	2,575 27	355 60	.....	1917-18
334 22	4,978 30	49,313 61	37,433 18	812 85	38,246 03	.....	11,067 58	1917-18
15 27		3,181 38	3,239 87	75 54	3,315 41	134 03	.....	.....
11 52		394 12	3,291 80	2,789 49	76 75	2,866 24	425 56	1916-17
35 30	354 55	4,348 79	4,823 78	60 05	4,883 83	535 04	.....	1917-18
278 12	2,842 84	28,878 79	29,660 39	367 57	30,027 96	1,149 17	.....	1917-18
209 97	2,839 24	22,803 48	25,127 99	319 20	25,447 19	2,643 71	.....	1919-20
8 47	100 61	1,715 20	2,558 66	44 33	2,602 99	887 79	.....	1916-17
30 00	320 81	4,568 60	4,628 99	90 78	4,719 77	151 17	.....	1917-18
2 77		1,200 55	867 27	25 04	892 31	.....	308 24	.....
7 10		3,532 30	2,254 16	69 89	2,324 05	.....	1,208 25	.....
12 22	152 22	2,103 90	2,313 58	46 03	2,359 61	255 71	.....	1916-17
6 20		81 41	948 99	1,052 61	12 77	1,065 38	116 39	1916-17
1,197 13	13,646 12	168,844 35	154,538 63	2,897 04	157,435 67	6,228 61	17,637 29	.....
226 00		2,793 09	22,448 60	25,345 64	.....	.....	.....	.....
1,423 13	16,439 21	191,292 95	179,884 27	2,897 04	157,435 67	6,228 61	17,637 29	.....

SEVERN SYSTEM

Reserve for Contingencies Account—31st October, 1920

Balances brought forward 31st October, 1919	\$5,110 68
Added during the year ending 31st October, 1920:	
Amount charged to Municipalities as part of the cost of power delivered to them	\$1,197 13
Provision against equipment employed in respect of contracts with sundry companies	226 00
Interest at 4% per annum on monthly balances to the credit of the account	204 43

	1,627 56
Expenditures during the year ending 31st October, 1920	\$6,738 24
Balance carried forward 31st October, 1920	1,063 30

	\$5,674 94

SEVERN SYSTEM

Reserve for Renewals Account—31st October, 1920

Total provision for Renewals to 31st October, 1919	\$146,154 18
Deduct expenditures to 31st October, 1919.....	4,402 37
Balance brought forward 31st October, 1919	141,751 81
Added during the year ending 31st October, 1920:	
Amounts charged to Municipalities as part of the cost of power delivered to them	\$33,615 83
Provision against equipment employed in respect of contracts with sundry companies	4,267 22
Interest at 4% per annum on monthly balances to the credit of the account	5,670 07
Renewals reserve provided on second-hand equipment purchased	139 50

	43,692 62
Expenditures during the year ending 31st October, 1920	\$185,444 43
	147 41

	\$185,297 02

SEVERN SYSTEM

Statement Showing the Total Sinking Fund Requirements to be met by each Municipality
Sinking Fund Requirements payment of which has been deferred by the Commission under Section 23 of the Act—
Sinking Fund Payments made by certain Municipalities which have been operating more than five years—and the Total of the Sinking Fund
Payments including interest allowed thereon to October 31, 1920

Municipality	Total Sinking Fund Requirements chargeable to the Municipality under the Act		Sinking Fund Requirements the Payment of which has been Deferred		Sinking Fund Requirements Paid (or Charged) as part of the Cost of Power		Interest at 4% per annum allowed on Sinking Fund requirements which have been paid		Total Sinking Fund Payments and accumulated Interest to the credit of the Municipality on 31 October, 1920
	(a) For Period of	(b) Amount	(a) For Period of	(b) Amount	(a) For Period of	(b) Amount	\$ c.	\$ c.	
Alliston	3 years ending 31st Oct., 1920	\$ 3,063 75	3 yrs. ending 31st Oct., 1920	3,063 75	3 yrs. ending 31st Oct., 1920	3,063 75	.....	.....	.....
Barrie	4	7,060 77	2	4,375 33	2 yrs. end. 31 Oct., '20	2,685 44	.....	52 31	2,737 75
Beeton	3	2,736 38	3	2,736 38	.....	.....	.....	.....	.....
Bradford	3	1,905 38	3	1,905 38	.....	.....	.....	.....	.....
Coldwater	4	965 55	2	548 78	2 yrs. end. 31 Oct., '20	416 77	8 50	.....	425 27
Collingwood	4	20,242 40	2	11,388 07	2 yrs. end. 31 Oct., '20	8,854 33	155 04	9,099 37	.....
Cookstown	3	1,144 79	3	1,144 79	1 yr. e. id. 31 Oct., '20	394 12	.....	.....	394 12
Creemore	4	1,570 25	3	1,176 13	1 yr. e. id. 31 Oct., '20	579 25	8 99	588 24	.....
Elmvale	4	1,527 91	2	948 66	2	4,701 47	74 34	4,775 81	.....
Midland	4	12,431 22	2	7,729 75	2	7,372 57	335 03	7,707 60	.....
Penetang	4	7,372 57	.....	4	4	100 61	.....	100 61	.....
Port McNicoll	4	497 04	3	396 43	1	545 33	8 98	554 31	.....
Stayner	4	1,591 35	2	1,046 02	2 .....	.....	.....	.....	.....
Thornton	2	367 58	2	367 58	.....	.....	.....	.....	.....
Tottenham	3	1,251 08	3	1,251 08	.....	.....	.....	.....	.....
Victoria Harbour	4	747 32	3	595 10	1 yr. e. id. 31 Oct., '20	152 22	.....	152 22	.....
Waubaushene	4	384 87	3	303 46	1	81 41	.....	81 41	.....
Totals—Municipalities	64,860 21	.....	38,976 69	.....	25,883 52	643 19	.....	26,526 71	.....
Totals—Companies (from commencement of operations)	11,959 94	(Nil)	.....	.....	From commencement of operations	11,959 94	854 87	12,814 81	.....
Grand Totals	76,820 15	.....	38,976 69	.....	37,843 46	1,498 06	.....	39,341 52	.....

SEVERN SYSTEM

Statement showing the net Credit or Charge to each Municipality in respect of power supplied to it to 31st October, 1919—the cash received and applied thereon, interest added during the year, also the amount Credited or Charged to each Municipality in respect of power supplied in the year ending 31st October, 1920 and the accumulated amount standing as a Credit or Charge to each Municipality at 31st October, 1920

WASDELL'S SYSTEM

Operating Account for Year Ending 31st October, 1920

Costs of operation as provided for under Sections 6 C and 23 of the Act.

Revenue for Period.

Cost of operating and maintaining Generating Plant, Transmission Lines, Stations, etc., including the proportion of Administrative Expenses chargeable to the operation of this System	\$14,732 52	Collected from Municipalities	\$20,563 06
Interest on Capital Investment	13,526 10	Power sold to Private Companies and to Severn System	17,513 95
Provision for renewal of Generating Plant, Lines, Stations, etc.	5,938 36	Add amounts due by certain Municipalities, being the difference between the sums paid and the Costs of Power supplied to them in the period	\$1,203 65
Provision for Contingencies	253 24	Deduct amounts collected from certain Municipalities in excess of the sums required to be paid by them for power supplied in the period .....	.....
<i>Provision for Sinking Fund:</i>		216 62	.....
By charges against Municipalities	\$2,656 27		1,087 03
By charges against contracts with Private Companies which purchased power	2,640 25	Revenue	\$39,164 04
		Loss on Sale of Power to Private Companies (written off against Contingency Reserve)	582 70
			<u><u>\$39,746 74</u></u>
			<u><u>\$39,746 74</u></u>

WASDELL

Statement showing the Amount to be Paid by each Municipality as the Cost, under Section
mission from each Municipality on Account of such Cost, and the Amount Credited
Actual Cost of Power Supplied to it

Municipality	Interim Rates per Horse Power Collected by Com- mission during year		Share of Capital Cost of System on which Interest and Fixed Charges are payable	Average H.P. supplied in year after correction for power factor	Share of Operating	
	To Jan. 1, 1920	To Oct. 31, 1920			Operating, Maintenance and Adminis- trative Expenses	Interest
Beaverton	\$ 45 00	\$ 55 00	\$ 35,404 80	104.2	\$ 2,237 23	\$ 1,612 68
Brechin.....	55 00	85 00	23,263 31	34.5	899 60	1,059 65
Cannington.....	50 00	65 00	33,235 43	81.1	1,584 96	1,513 86
Kirkfield .....	.....	45 00	4,824 07	4.3	106 09	121 47
Sunderland	55 00	85 00	28,850 85	47.5	974 57	1,314 15
Woodville	55 00	80 00	26,833 02	47.9	941 63	1,222 23
Totals—Municipalities			152,411 48	319.5	6,744 08	6,844 04
Totals—Companies			169,253 95	.....	7,988 44	6,682 06
Grand Totals			321,665 43	319.5	14,732 52	13,526 10

SYSTEM

23 of the Act, of Power Supplied to it by the Commission, the Amount Received by the Com-
or Charged to each Municipality upon ascertaining by annual adjustment the
in the Year Ending 31st October, 1920

Costs and Fixed Charges			Shortage From Sale of Power to Severn System	Total Cost of Power for year as provided to be paid under Section 23 of Act	Amounts Paid to the Com- mission by each Muni- cipality	Amount Credited or charged to each Municipality upon ascertaining the Cost of Power by Annual Adjustment		Sinking Fund for the Years mentioned hereunder charged as part of the Cost of Power in the Year 1919-1920
Renewals	Conting- encies	Sinking Fund				Credited	Charged	
\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	
708 02	34 45	637 21	718 30	5,947 89	5,307 59	.....	640 30	1920
465 22	11 41	418 70	376 68	3,231 26	2,689 12	.....	542 14	1920
664 63	26 81	598 17	506 61	4,895 04	4,966 69	71 65	.....	1920
53 32	1 42	.....	31 28	313 58	192 37	.....	121 21	1920
576 95	15 69	519 25	332 74	3,733 35	3,767 81	34 46	.....	1920
536 60	15 83	482 94	329 74	3,528 97	3,639 48	110 51	.....	1920
3,004 74	105 61	2,656 27	2,295 35	21,650 09	20,563 06	216 62	1,303 65	.....
2,933 62	147 63	2,640 25	2,295 35	18,096 65	17,513 95	.....	*582 70	.....
5,938 36	253 24	5,296 52	.....	39,746 74	38,077 01	.....	1,669 73	.....

* Charged to Contingency Reserve.

WASDELL'S SYSTEM

Reserve for Contingencies Account—31st October, 1920

Balance brought forward, 31st October, 1919	\$14,277 43
Added during the year ending 31st October, 1920:	
Amount charged to Municipalities as part of the cost of Power delivered to them	\$105 61
Provision against equipment employed in respect of con- tracts with Severn System and Companies	147 63
Interest at 4% per annum on monthly balance to the credit of the account	571 10
	824 34
	\$15,101 77
Expenditures (including the restringing of aluminum cable during the year ending 31st October, 1920	\$14,519 07
Losses for the year on power sold to Private Companies	582 70
	\$15,101 77
Balance	Nil

WASDELL'S SYSTEM

Reserve for Renewals Account—31st October, 1920

Total provision for Renewals to 31st October, 1919	\$27,416 02
Deduct:	
Expenditures to 31st October, 1919	858 47
Balance brought forward, 31st October, 1919	\$26,557 55
Added during the year ending 31st October, 1920:	
Amounts charged to Municipalities as part of the Cost of Power delivered to them	\$3,004 74
Provision against equipment employed in respect of Severn System and Companies	2,933 62
Interest at 4% per annum on the monthly balances to the credit of the account	1,062 36
	7,000 67
	\$33,558 22
Expenditures during the year ending 31st October, 1920	2,284 71
Balance carried forward, 31st October, 1920	\$31,273 51

WASDELL'S SYSTEM

Statement showing the Total Sinking Fund Requirements to be met by each Municipality—
 Sinking Fund Requirements the payment of which has been deferred by the Commission under Section 23 of the Act—Sinking Fund Payments made by certain Municipalities who have been operating more than five years—and the total of the Sinking Fund Payments to 31st October, 1920

Municipality	Total Sinking Fund Requirements Charged to the Municipality under the Act		Sinking Fund Requirements the payment of which has been deferred		Sinking Fund paid (or charged) as part of the cost of power		Total Sinking Fund Payments to the Credit of the Municipality on 31st Oct, 1920
	(a) For Period of	(b) Amount	(a) For Period of	(b) Amount	(a) For Period of	(b) Amount	
Beaverton ..	1 year ending 31st Oct., 1920,	\$ 637 21.			\$	1 year ending 31st Oct., 1920	\$ 637 21
Brechin.....	1	418 70			1 .....	.. .. .. ..	418 70
Cannington ..	1	598 17			1 .....	.. .. .. ..	598 17
Kirkfield.....	1	48 00	1 year ending 31st Oct., 1920	48 00			
Sunderland ..	1	519 25			1	1 year ending 31st Oct., 1920	519 25
Woodville ..	1	482 94			1 .....	.. .. .. ..	482 94
Totals—Municipalities		2,704 27			48 00 .....	.....	2,656 27
Totals—Companies (from commencement of operations)		2,640 25 (nil)				(From commencement of operations)	2,640 25
Grand Totals		5,344 52			48 00		5,296 52

WASDELL'S SYSTEM

Statement showing the net charge to each Municipality in respect of Power supplied to it to 31st October, 1919—and interest added during the year, also the amount credited or charged to each Municipality in respect of Power supplied in the year ending 31st October, 1920, and the accumulated amount standing as a charge to each Municipality at 31st October, 1920

Municipality	Date Commenced Operating	Net Charge at 31st October, 1919	Interest at 4% per annum added during the year	Amount credited or charged in respect of power sup- plied in year ending 31st October, 1920		Accumulated amount standing at the Credit or Charge on 31st October, 1920	
				Charged	Credited		Charged
Beaverton	Nov., 1914.....	\$ 4,226 80	\$ e. 169 06	\$ e.	\$ e. 640 30	\$ e.	\$ e. 5,036 16
Brechin	Jan., 1915.....	2,961 78	118 47	.....	542 14	.....	3,622 39
Cannington	Nov., 1914.....	3,977 79	159 11	71 65	.....	.....	4,065 25
Kirkfield.....	June, 1920.....	.....	.....	.....	121 21	.....	121 21
Sunderland	Nov., 1914.....	3,862 42	154 51	34 46	.....	.....	3,982 47
Woodville.....	Nov., 1914.....	3,621 70	144 87	110 51	.....	.....	3,656 06
		18,650 49	746 02	216 62	1,303 65	.....	20,483 54

WASDELL'S RURAL LINES

Operating Account for Year ending 31st October, 1920

Interest on Capital Investment.....	\$583 29	Revenue—
Interest and Sinking Fund from the Municipalities which operate the line.....	\$782 68	
\$782 68		

Statement showing Interest and Sinking Fund Charges on each Line for the year ending 31st October, 1920

—	Capital Cost	Interest	Sinking Fund	Total Interest and Sinking Fund Charges	Revenue from Municipalities
Beaverton	\$ 4,767 48	\$ 278 55	\$ 80 87	\$ 359 42	\$ 359 42
Brechin	613 25	37 96	11 02	48 98	48 98
Brock Twp.	3,801 62	183 43	81 82	265 25	265 25
Woodville.....	2,109 37	83 35	25 68	109 03	109 03
Totals	11,281 72	583 29	199 39	782 68	782 68

Statement showing the total Sinking Fund requirements in respect of each Line, and the total of the Sinking Fund payments, with Interest allowed thereon to 31st October, 1920

—	Period Covered	Sinking Fund Requirements	Amount	Sinking Fund Paid	Interest at 4% per annum allowed on Sinking Fund Payments	Total Sinking Fund Payments and Accumulated Interest to 31st October, 1920
Beaverton	3 years ending 31st October, 1920.....	\$ 185 62	\$ 185 62	\$ 5 40	\$ 191 02	
Brechin	" "	31 99	31 99	84	83	
Brock Twp.	" "	125 44	125 44	1 74	127 18	
Woodville.....	" "	25 68	25 68	.....	25 68	
Totals		368 73	368 73	7 98		376 71

EUGENIA SYSTEM

Operating Account for Year Ending 31st October, 1920

Costs of operation as provided for under Sees. 6c. and 23 of the Act:	<i>Revenue for Period:</i>	
Cost of operating and maintaining the Generating Plant, Transmission Lines, Stations, etc., including the proportion of Administrative expenses chargeable to the operation of this system	Collected from Municipalities	\$119,357 98
	Power sold to Private Companies and to Severn System	6,585 33
	Add amounts due by certain Municipalities being the deficiency between sums paid and the costs of power supplied to them in the period	40,840 36
	 <i>Revenue</i>	 \$166,783 67
\$62,179 71 76,884 61	Loss on sale of power to Private Companies (written off against Contingency Reserve).	3,091 85
29,972 45		
	 <i>Revenue</i>	 \$169,875 52
	By charges against Municipalities	
	By charges against contracts with Private Companies, also the Severn System which purchased power	41 00
		838 75
		 \$169,875 52
		 \$169,875 52

EUGENIA SYSTEM.

Statement showing the Amount to be Paid by each Municipality as the Cost, under Section 23 of the Act—of Power Supplied to it by the Commission—the Amount Received by the Commission from each Municipality on account of such Cost—and the Amount Credited or Charged to each Municipality upon ascertaining by annual adjustment the Cost of Power Supplied to it in the year ending October 31, 1920.

EUGENIA

Statement showing the Amount to be Paid by each Municipality as the Cost, under Section
mission from each Municipality on Account of such Cost—and the Amount
adjustment the Cost of Power applied to

Municipality	Interim Rates per Horse Power Collected by Commission during year		Share of Capital Cost of System on which Interest and Fixed Charges are payable	Average Horse Power supplied in year after correction for power factor	Share of Operating	
	To Jan. 1, 1920	To Oct. 31, 1920			Operating, Maintenance and Adminis- trative Expenses	Interest
Arthur	\$ 45 00	\$ 65 00	\$ 98,390 56	129.	\$ 3,753 92	\$ 4,499 10
Chatsworth	30 00	45 00	13,877 79	29.	644 92	636 05
Chesley.....	40 00	45 00	123,737 23	250.3	3,976 84	5,666 17
Dundalk	27 00	38 00	34,920 17	87.7	1,779 65	1,592 98
Durham	33 00	45 00	39,183 66	100.6	2,042 92	1,798 41
Elmwood	35 00	45 00	24,599 35	51.	1,058 30	1,127 40
Flesherton.....	26 00	36 00	22,764 99	57.3	974 55	1,044 62
Grand Valley	45 00	60 00	38,986 67	60.7	1,758 96	1,784 07
Hanover	35 00	35 00	246,672 75	593.1	9,937 09	10,655 02
Holstein	44 00	75 00	13,190 42	9.3	443 38	601 95
Hornings Mills.....	.....	.....	4,968 03	5.	1,172 27	226 80
Markdale	23 00	35 00	29,898 30	85.7	1,198 45	1,373 35
Mount Forest	40 00	55 00	94,000 21	151.6	3,364 65	4,263 76
Neustadt	42 50	45 00	48,234 10	84.2	1,747 16	2,114 63
Orangeville	35 00	55 00	89,295 98	136.2	2,958 53	4,079 91
Owen Sound	28 00	28 00	444,959 77	1,132.2	16,176 79	20,421 01
Shelburne	30 00	38 00	81,237 57	183.6	3,336 32	3,718 61
Tara	37 00	85 00	45,563 21	44.6	1,382 62	2,081 69
Totals—Municipalities			1,494,480 76	3,191.1	57,709 32	67,685 53
Totals—Companies and Severn System (which purchased power)....	201,469 53		164.	4,470 39	9,199 08	
Non-operating Capital	217,815 21		.....	.....	.....	.....
Grand Totals.....	1,913,765 50		3,355.1	62,179 71	76,884 61	

SYSTEM

23 of the Act—of Power Supplied to it by the Commission—the Amount Received by the Commission Credited or Charged to each Municipality upon ascertaining by annual it in the Year Ending 31st October, 1920

Costs and Fixed Charges		Loss on Sale of Power to Severn System charged to Municipalities in proportion to their Maintenance Costs	Total Cost of Power for year as provided to be paid under Section 23 of Act	Amounts Paid to Commission by each Municipality	Amount charged to each Municipality upon ascertaining the Cost of Power by annual adjustment
Renewals	Contingencies				
\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
2,082 86	32 25	774 36	11,142 49	7,828 36	3,314 13
241 64	7 25	94 36	1,624 22	1,192 75	431 47
2,192 07	62 57	618 67	12,518 32	10,931 72	1,586 60
531 22	21 92	254 84	4,180 61	3,092 46	1,068 15
591 92	25 15	247 42	4,705 82	4,234 08	471 74
430 28	12 75	146 85	2,775 58	2,142 32	633 26
359 74	14 32	126 59	2,519 82	1,862 98	656 84
779 10	15 17	291 53	4,628 83	3,370 25	1,258 58
3,521 28	148 27	1,435 56	25,697 22	20,757 49	4,939 73
317 74	2 33	89 98	1,455 38	650 91	804 47
112 38	1 25	81 42	1,594 12	635 26	908 86
423 93	21 42	141 64	3,158 79	2,749 04	409 75
1,829 87	37 90	637 62	10,133 20	7,961 60	2,171 60
863 30	21 05	261 55	5,007 69	3,552 07	1,455 62
1,794 47	34 05	587 22	9,454 18	6,770 41	2,683 77
6,770 82	283 05	2,192 00	45,843 67	31,702 35	14,141 32
1,343 73	45 90	530 41	8,974 97	6,558 99	2,416 07
1,037 76	11 15	270 21	4,783 43	3,315 03	1,468 40
25,224 11	797 75	8,781 63	160,198 34	119,357 98	40,846 36
4,748 34	41 00	8,781 63	9,677 18	6,585 33	*3,091 85
29,972 45	838 75	.....	169,875 52	125,943 31	.....

* Charged to Contingency Reserve.

EUGENIA SYSTEM

Reserve for Contingencies Account—31st October, 1920

Balance brought forward 31st October, 1919	\$19,488 48
Added during the year ending 31st October, 1920:	
Amount charged to Municipalities as part of the cost of power delivered to them	\$797 75
Provision against equipment employed in respect of contracts with sundry companies	41 00
Interest at 4% per annum on monthly balances to the credit of the account	779 54
	<u>1,618 29</u>
Expenditures during the year ending 31st October, 1920..	\$21,106 77
Losses for the year on power sold to Private Companies.	3,091 85
	<u>7,675 83</u>
Balance carried forward 31st October, 1920	\$13,430 94

EUGENIA SYSTEM

Reserve for Renewals Account—31st October, 1920

Total provision for renewals to 31st October, 1919	\$101,609 90
Deduct expenditures to 31st October, 1919	785 58
Balance brought forward 31st October, 1919	\$100,824 32
Added during the year ending 31st October, 1920:	
Amounts charged to Municipalities as part of the cost of power delivered to them	\$25,224 11
Provision against equipment employed in respect of contracts with sundry companies	4,748 34
Interest at 4% per annum on the monthly balance to the credit of the account	4,032 97
Renewal reserve provided on second-hand equipment transferred	1,163 37
	<u>35,168 79</u>
Expenditures during the year ending 31st October, 1920	\$135,993 11
	<u>230 91</u>
	<u>\$135,762 20</u>

EUGENIA SYSTEM

Statement showing the net credit or charge to each Municipality in respect of power supplied to it 31st October, 1919—the Cash received and applied thereon, Interest added during the year, also the amount charged to each Municipality in respect of power supplied in the year ending 31st October, 1920, and the accumulated amount standing as a charge to each Municipality at 31st October, 1920

Municipality	Date Commenced Operating	Net Credit or Charge at 31st October, 1919		Cash receipts and pay- ments on account of such charges	Interest 4% per annum added during the year	Credited	Charged	Amount charged in re- spect of power supplied in year ending 31st Oct., 1920	Accumulated amount standing at the charge on 31st October, 1920
		Credit	Charge						
Arthur	Dec., 1916	\$ 6,057.46		\$	\$	\$ 242.30	\$ 3,314.13	\$	\$ 9,613.89
Chatsworth	Dec., 1915	1,103.74				44.15	431.47		1,579.36
Chesley	July, 1916	5,973.57				238.94	1,586.60	7,799.11	
Dundalk	Dec., 1915	2,617.90				104.72	1,088.15	5,810.77	
Durham	Dec., 1915	2,238.26				89.53	471.74	2,799.53	
Elmwood	Apr., 1918	417.05				16.68	633.26	1,066.99	
Flesherton	Dec., 1916	1,414.56				56.58	656.84	2,127.98	
Grand Valley	Dec., 1916	1,147.11				45.88	1,258.88	2,451.57	
Hanover	Sept., 1916	2,839.73				112.39	4,939.73	2,017.61	
Holstein	May, 1916	2,658.88				106.36	804.47	3,569.71	
Hornins Mills	July, 1916	42.26				1.69	908.96	864.91	
Markdale	Mar., 1916	1,444.44				57.78	409.75	1,911.97	
Mount Forest	Dec., 1915	13,284.85				531.39	2,171.60	15,987.84	
Nenstadt	Dec., 1918	832.53				33.30	1,455.62	2,321.45	
Orangeville	July, 1916	5,384.08				215.36	2,683.77	8,283.21	
Owen Sound	Dec., 1915	12,179.68				487.19	14,141.32	1,474.45	
Shelburne	July, 1916	1,397.63				54.82	2,416.07	3,794.42	
Tara	Feb., 1918	3,783.22				151.33	1,468.40	5,402.95	
Totals		15,031.67	49,755.28		74.10	601.27	1,989.12	40,840.36	76,877.72

EUGENIA RURAL LINES

Operating Account for Year Ending 31st October, 1920

	REVENUE
Interest on Capital Investment	\$94 12
Provision for Sinking Fund	30 52
Totals	<u>\$124 64</u>
	<u>Total.....</u>
	<u>\$124 64</u>

Statement showing Interest and Sinking Fund Charges, 31st October, 1920

—	Capital Cost	Interest	Sinking Fund	Total Interest and Fixed Charges	Revenue from Municipalities
Markdale.....	\$ 1,182 53	\$ 62 38	\$ 21 30	\$ 83 68	\$ 83 68
Flesherton.....	512 08	31 74	9 22	40 96	40 96
Totals.....	1,694 61	94 12	30 52	124 64	124 64

Statement showing the total Sinking Fund requirements of each Municipality and the total of the Sinking Fund Payments with interest allowed thereon to 31st October, 1920

—	Total Sinking Fund Requirements		Sinking Fund Paid	Interest at 4% per annum allowed on Sinking Fund Payments	Total Sinking Fund Payments and accumulated Interest to 31st October, 1920
	Period Covered	Amount			
Markdale	4 years ending 31st Oct., 1920	\$ 75 53	\$ 75 53	\$ 4 00	\$ 79 53
Flesherton.....	3 , , , , ,	25 36	25 36	94	26 30
Totals.....		100 89	100 89	4 94	105 83

MUSKOKA SYSTEM

Operating Account for Year Ending 31st October, 1920

Costs of operation as provided for under Sections 6c, and 23 of the Act:	Revenue for Period:
Cost of operating and maintaining Generating Plant, Transmission Lines, Stations, etc., including the proportion of Administrative expenses chargeable to the operation of this system	\$9,775 34
Interest on Capital Investment	9,661 89
Provision for renewal of Generating Plant, Lines, Stations, etc.	7,432 25
Provision for Contingencies:	
By charges against Municipalities	\$337 50
By appropriating the net pro- fits on power sold to sun- dry customers at Muskoka Falls	31 27
	368 77
	<hr/>
	\$27,238 25
	<hr/>
Deduct amounts collected from certain Municipalities in ex- cess of the sums required to be paid by them for power supplied in the period	\$28,541 84
Add amounts due by certain Munici- palities, being the difference between sums paid and the costs of power supplied to them in the period	684 26
	<hr/>
	1,303 59
	<hr/>
	\$27,238 25

MUSKOKA SYSTEM

Statement showing the Amount to be Paid by each Municipality as the Cost—under Section 23 of the Act—of Power supplied to it by the Commission, the Amount received by the Commission from each Municipality on account of such Cost, and the amount credited or charged to each Municipality upon ascertaining by annual adjustment the actual cost of power supplied to it in the year ending 31st October, 1920

Municipality	Interim Rates per Horse Power collected by Commission during year	Share of Capital Cost of System on which Interest and Fixed Charges are payable	Average Horse Power supplied in year after correction for power factor	Share of Operating Costs and Fixed Charges			Total Cost of Power for year as paid to the Commission to be paid under Section 23 of the Act	Amounts Credited to each Municipality upon ascertaining the Cost of Power by annual adjustment	Amounts Credited to each Municipality by Commission for payment by Sec. 23 of the Act	Charged
				Interest	Renewals	Contingencies				
Gravenhurst	\$ 14.00	\$ 47,985.03	% 478.4	\$ 3,397.74	\$ 2,185.71	\$ 1,679.29	\$ 119.60	\$ 7,382.34	\$ 6,698.08	\$ c.
Huntsville	25.00	163,848.23	871.6	6,377.60	7,463.24	5,743.02	217.90	19,801.76	21,789.61	1,987.85
Totals Municipalities	211,833.26	1,350.0	9,775.34	9,648.95	7,422.31	337.50	27,184.10	28,487.69	1,987.85	684.26
Muskoka Falls (Sundry Customers) .....	.....	284.01	.....	.....	12.94	9.94	.....	22.88	54.15	31.27
Grand Totals	212,117.27	.....	9,775.34	9,661.89	7,432.25	337.50	27,206.98	28,541.84	.....	.....

MUSKOKA SYSTEM

Reserve for Contingencies Account—31st October, 1920

Balance brought forward 31st October, 1919	\$1,096 18
Added during the year ending 31st October, 1920:	
Amount charged to Municipalities as part of the cost of power delivered to them	\$337 50
Profit on the sales of power to sundry customers at Muskoka Falls	31 27
Interest at 4% per annum on monthly balances to the credit of the account	43 85
	412 62
Balance carried forward 31st October, 1920	\$1,508 80

MUSKOKA SYSTEM

Reserve for Renewals Account—31st October, 1920

Total provision for renewals to October 31, 1919	\$20,616 59
Deduct expenditures to 31st October, 1919	1,180 12
Balance brought forward 31st October, 1919	\$19,436 47
Added during the year ending 31st October, 1920:	
Amount charged to Municipalities as part of the cost of power delivered to them	\$7,422 31
Provision against equipment in respect of Muskoka Falls	9 94
Interest at 4% per annum on the monthly balances to the credit of the account	777 46
	8,209 71
	\$27,646 18

MUSKOKA SYSTEM

Statement showing the net charge to each Municipality in respect of power supplied to it to 31st October, 1919.—Interest added during the year, also the amount credited or charged to each Municipality in respect of power supplied in the year ending 31st October, 1920, and the accumulated amount standing as a charge to each Municipality at 31st October, 1920

Municipality	Date Commenced Operating	Net charge at 31st October, 1919	Interest at 4% per annum charged during the year	Amount credited or charged in respect of power supplied in the year ending 31st October, 1920		Accumulated amount standing at the charge on 31st October, 1920
				Credited	Charged	
Gravenhurst	Nov, 1915.....	\$ 5,279 73	\$ c. 211 19	.....	\$ c. 684 26	\$ c. 6,175 18
Huntsville	Sep, 1916.....	6,400 17	256 01	1,987 85	.....	4,668 33
Totals.....		11,679 90	467 20	1,987 85	684 26	10,843 51

RIDEAU SYSTEM

Operating Account for Year Ending 31st October, 1920

Costs of operation as provided for under Sections 6c. and 23 of the Act:	Revenue for Period:
Power Purchased	\$6,705 05
Cost of operating and maintaining Generating Plant, Transmission Lines, Stations, etc., including the proportion of Administrative expenses chargeable to the operation of this System	14,535 23
Interest on Capital Investment	29,367 77
Provision for renewal of Generating Plant, lines, Stations, etc.	14,505 58
Provision for contingencies:	
By charges against Municipalities	409 38
	Revenue
	\$65,523 01
	Collected from Municipalities
	Add amounts due by certain Municipalities, being the difference between sums paid and the cost of power supplied to them in the period
	Deduct amounts collected from certain Municipalities in excess of the sums required to be paid by them for power supplied in the period
	2,164 30
	3,143 23
	Revenue
	65,523 01
	<u><u>\$65,523 01</u></u>

RIDEAU

Statement showing the Amount to be Paid by each Municipality as the Cost under Section
mission from each Municipality on Account of such Cost—and the Amount
adjustment the Cost of Power Supplied to

Municipality	Interim Rates per Horse Power Collected by Commission during Year		Share of Cap- ital Cost of System on which Inter- est and Fixed Charges are Payable	Average Horse Power Supplied in Year after Cor- rection for Power Factor	Cost of Power to Commission
	To May 31, 1920	From June 1, 1920			
Carleton Place.....	\$ 33 00	\$ 44 95	\$ 360,212 16	616.8	\$ 523 34
Perth	32 00	41 80	274,391 20	382.	2,289 43
Rideau Development (Power)	14 00 + 543 10 per month	.....	.....	52.	615 35
Smith's Falls	28 00	38 32	397,828 18	586.7	3,276 93
Totals.....	.....	.....	1,032,387 92	1,637.5	6,705 05

SYSTEM

23 of the Act—of Power Supplied to it by the Commission—the Amount Received by the Com-
Credited or Charged to each Municipality upon ascertaining by annual
it in the Year Ending 31st October, 1920

Operating, Maintenance and Adminis- trative Ex- penses	Share of Operating Costs and Fixed Charges			Total Cost of Power for Year as Pro- vided to be Paid under Section 23 of Act	Amounts Paid to Commission by each Municipality	Amount Credited or Charged to each Municipality upon ascertaining the Cost of Power by annual adjustment	
	Interest	Renewals	Conting- encies			Credited	Charged
\$ 7,034 53	\$ 9,318 63	\$ 4,603 05	\$ 154 20	\$ 21,633 75	\$ 23,798 05	\$ 2,164 30	\$ 2
3,121 37	8,306 68	4,102 73	95 50	17,915 71	14,409 44	.....	3,506 27
329 99	2,012 56	994 13	13 00	3,965 03	3,965 03	.....	.....
4,049 34	9,729 90	4,805 67	146 68	22,008 52	20,207 26	.....	1,801 26
14,535 23	29,367 77	14,505 58	409 38	65,523 01	62,379 78	2,164 30	5,307 53

RIDEAU SYSTEM

Reserve for Contingencies Account—31st October, 1920

Balance brought forward 31st October, 1919	\$207 70
Added during the year ending 31st October, 1920:	
Amount charged to Municipalities as part of the cost of power delivered to them	\$409 38
Interest at 4% per annum on monthly balance to the credit of the account	8 31
	417 69
Balance carried forward 31st October, 1920	\$625 39

RIDEAU SYSTEM

Reserve for Renewals Account—31st October, 1920

Total provision for renewals to 31st October, 1919	\$5,153 92
Added during the year ending 31st October, 1920:	
Amount charged to Municipalities as part of the cost of power delivered to them	\$14,505 58
Interest at 4% per annum on the monthly balances to the credit of the account	206 16
Renewals Reserve provided on second-hand equipment transferred	1,956 55
	16,668 29
Balance carried forward 31st October, 1920	\$21,822 21

RIDEAU SYSTEM

Statement showing the Net Credit or Charge to each Municipality in respect of Power Supplied to it to 31st October, 1919—Interest Added during the Year; also the Amount Credited or Charged to each Municipality in respect of Power Supplied in the Year Ending 31st October, 1920, and the Accumulated Amount standing as a Credit or Charge to each Municipality at 31st October, 1920

Municipality	Date Commenced Operating	Net Credit or Charge at 31st October, 1919		Interest at 4% per annum added during the year		Amount Credited or Charged in respect of Power Supplied in the year ending 31st October, 1920		Accumulated Amount standing at the Credit or Charge on 31st October, 1920	
		Credit	Charge	Credited	Charged	Credited	Charged	Credit	Charge
Carleton Place	May, 1919.....	\$ 2,932 53	c.	\$ 117 30	c.	\$ 2,164 30	c.	\$ 5,214 13	c.
Perth.....	Feb., 1919.....	1,719 27	c.	68 77	c.	3,506 27	c.	5,294 31	c.
Smith's Falls	Sep., 1918.....	1,058 87	c.	42 35	c.	1,801 26	c.	700 04	c.
Totals .....	.....	3,991 40	1,719 27	159 65	68 77	2,164 30	5,307 53	5,214 13	5,994 35

ST. LAWRENCE SYSTEM

Operating Account Year Ending 31st October 1920

Costs of operations as provided for under Sections 6c and 23 of the Act;

Revenue for Period:	
Power Purchased	\$33,710 84
Costs of operating and maintaining the Generating Plant, Transmission Lines, Stations, etc., including the proportion of Administrative expenses chargeable to the operation of this System	16,935 23
Interest on Capital Investment	24,527 99
Provision for renewal of Lines, Stations, etc.	21,537 01
Provision for contingencies	3,185 52
Provision for Sinking Fund	4,639 67
	<hr/>
	\$104,536 26
Collected from Municipalities	\$72,443 32
Power sold to Private Companies	22,870 72
Add amounts due by certain Municipalities, being the difference between sums paid and the costs of power supplied to them in the period	6,055 00
	<hr/>
Loss on sale of power supplied to Private Companies (written off against Contingency Reserve)	\$101,369 04
	<hr/>
	\$104,536 26

ST. LAWRENCE SYSTEM.

Statement showing the Amount to be Paid by each Municipality as the Cost, under Section 23 of the Act—of Power Supplied to it by the Commission—the Amount Received by the Commission from each Municipality on Account of such Cost—and the Amount Charged to each Municipality upon ascertaining by annual adjustment the actual cost of Power Supplied to it in the year ending October 31, 1920.

ST. LAWRENCE

Statement Showing the Amount to be Paid by Each Municipality as the Cost—Under Section Commission from Each Municipality on Account of Such Cost, and the amount Charged Power Supplied to it in the Year

Municipality	Interim Rates per Horse Power Col- lected by Commis- sion during year	Share of Capital Cost of System on which In- terest and Fixed Charges are Payable	Average Horse Power Supplied in Year after Cor- rection for Power Factor	Cost of Power to Commis- sion	Share of Operating	
					Operating Main- tenance and Adminis- trative Expenses	Interest
Brockville.....	45.19	\$ 278,187 28	1,004.8	\$ 15,967 69	\$ 7,597 29	12,578 99
Chesterville.....	76.73	68,756 78	148.	2,352 28	1,928 13	3,118 78
Prescott.....	44.93	52,249 25	201.8	3,207 32	1,833 87	2,353 66
Williamsburg	50.00	4,527 60	18.6	260 42	370 16	206 23
Winchester	69.84	31,320 13	83.9	1,333 47	1,785 04	1,419 19
Totals—Municipalities		435,041 04	1,457.1	23,121 18	13,514 49	19,676 85
Totals—Companies....		107,798 24	666.6	10,589 66	3,420 74	4,851 14
Non-Operating Capital.....		98,294 31	.....	.....	.....	.....
Grand Totals		641,133 59	2,123.7	33,710 84	16,935 23	24,527 99

SYSTEM

23 of the Act—of Power Supplied to it by the Commission—The Amount Received by the
to Each Municipality upon ascertaining by annual adjustment the actual cost of
Ending 31st October, 1920.

Costs and Fixed Charges			Total Cost of Power for Year as Pro- vided to be Paid Under Sec. 23 of Act	Amounts Paid to the Commission by each Municipality	Amounts Charged to each Munici- pality upon ascertaining the Cost of Power by Annual Adjustment	Sinking Fund for the years mentioned hereunder charged as part of the Cost of Power in the year 1919-1920
Renewals	Contingen- cies	Sinking Fund				
\$ 11,045 10	\$ 1,507 20	\$ 00	\$ *48,696 27	\$ 45,405 27	\$ 3,291 00	.....
2,738 46	222 00	1,232 00	*\$ 11,591 65	11,187 08	404 57	1919-1920
2,066 65	302 70	930 00	10,694 20	9,064 58	1,629 62	1919-1920
181 08	27 90	.....	1,045 79	929 16	116 63	.....
1,246 13	125 82	560 76	6,470 41	5,857 23	613 18	1919-1920
17,277 42	2,185 62	2,722 76	78,498 32	72,443 32	6,055 00	.....
4,259 59	999 90	1,916 91	26,037 94	22,870 72	*\$ 3,167 22	.....
.....
21,537 01	3,185 52	4,639 67	104,536 26	95,314 04	.....	.....

*Charged to Contingency Reserve.

ST. LAWRENCE SYSTEM

Reserve for Contingencies Account—31st October, 1920

Balance brought forward 31st October, 1919—.....	\$1,555 24
 Added during the year ending 31st October, 1920 —	
Amount charged to Municipalities as part of the cost of power delivered to them	\$2,185 62
Provision against equipment employed in respect of contracts with company	999 90
Interest at 4% per annum on the monthly balances to the credit of the account	62 20

	3,247 72

	\$4,802 96
 Deduct:—	
Loss for year on power sold to Private Companies	\$3,167 22
Expenditures during the year ending 31st October, 1920	543 07

	3,710 29
Balance carried forward 31st October, 1920	\$1,092 67

ST. LAWRENCE SYSTEM

Reserve for Renewals Account—31st October, 1920

Total provision for renewals 31st October, 1919—.....	\$47,406 30
Deduct expenditures to 31st October, 1919—.....	479 03
 Balance brought forward 31st October, 1919	
	\$46,927 27
 Added during the year ending 31st October, 1920:	
Amount charged to Municipalities as part of the cost of power delivered to them	\$17,277 42
Provision against equipment employed in respect of contracts with Private Companies	4,259 59
Interest at 4% per annum on the monthly balances to the credit of the account	1,877 09

	23,414 10
 Expenditures during the year ending 31st October, 1920	
	\$70,341 37
	1,430 70

	\$68,910 67

ST. LAWRENCE SYSTEM.

Statement showing the Total Sinking Fund Requirements to be met by each Municipality—Sinking Fund Requirements, the Payment of which has been Deferred by the Commission under Section 23 of the Act—Sinking Fund Payments made by Certain Municipalities who have been operating more than Five Years—and the Total of such Sinking Fund Payments to October 31, 1920.

ST. LAWRENCE

Statement Showing the Total Sinking Fund Requirements to be met by each Municipality.
 Section 23 of the Act—Sinking Fund Payments made by Certain Municipalities
 Fund Payments to

Municipality	Total Sinking Fund Requirements Chargeable to the Municipality under the Act				
	(a) For period of			(b) Amounts	
	1 year ending Oct. 31, 1920	\$	c.		
Brockville	1 year ending Oct. 31, 1920	4,970	18		
Chesterville.....	1 " " " "	1,232	00		
Prescott.....	1 " " " "	930	00		
Williamsburg	1 " " " "	81	49		
Winchester	1 " " " "	560	76		
Totals—Municipalities		7,774	43		
Totals—Companies (from commencement of operations).....		1,916	91		
Grand Totals		9,691	34		

SYSTEM

Sinking Fund Requirements, the Payment of which has been Deferred by the Commission under who have been Operating more than Five Years—and the Total of such Sinking
31st, October, 1920

Sinking Fund Requirements, the payment of which has been deferred		Sinking Fund Requirements paid (or charged) as part of the Cost of Power	
(a) For period of	(b) Amounts	(a) For period of	(b) Amounts
1 year ending Oct. 31, 1920	\$ 4,970 18	.....	\$ .....
.....	.....	1 year ending Oct. 31, 1920	1,232 00
.....	.....	1 " " " "	930.00
1 year ending Oct. 31, 1920	81 49	.....	.....
.....	.....	1 year ending Oct. 31, 1920	560 76
.....	5,051 67	.....	2,722 76
(Nil)	.....	(From commencement of operations)	1,916 91
.....	5,051 67	.....	4,639 67

ST. LAWRENCE SYSTEM

Statement showing the net charge to each Municipality in respect of power supplied to it to 31st October, 1919—interest added during the year,
 Also the amount charged to each Municipality in respect of power supplied in the year ending 31st October, 1920, and the
 accumulated amount standing as a charge to each Municipality at 31st October, 1920

Municipality	Date commenced Operating	Net charge at 31st October, 1919	Interest at 4% per annum charged during the year	Amount charged in respect of power sup- plied in year ending 31st October, 1920	Accumulated amount standing at the charge on 31st Octo- ber, 1920
Brockville	April, 1915.....	\$ 10,606.71	\$ 424.28	\$ 3,291.00	\$ 14,321.99
Chesterville	March, 1914.....	8,166.41	326.65	404.57	8,897.63
Prescott.....	Dec., 1913.....	2,438.17	97.53	1,629.62	4,165.32
Williamsburg	April, 1915.....	1,376.26	55.05	116.63	1,547.94
Winchester.....	Jan. 1914.....	4,542.46	181.69	613.18	5,337.33
Totals.....	.....	27,130.01	1,085.20	6,055.00	34,270.21

THUNDER BAY SYSTEM

Operating Account for Year Ending 31st October, 1920

Costs of operation as provided for under Sections
6c and 23 of the Act:

Power Purchased	\$81,945 00
Costs of operating and maintaining the Transmission Lines, Stations, etc., including the proportion of Administrative expenses chargeable to the operation of this System.	8,963 08
Interest on Capital Investment	5,395 44
Provision for renewal of Lines, Stations, etc....	4,145 32
Provision for Contingencies	1,367 07
Provision for Sinking Fund	2,132 14

Revenue for Period:

Collected from City of Port Arthur	\$114,199 64
Less amount collected from Port Arthur in excess of the sum required to be paid by it for power supplied in the period	10,251 59
Revenue	<u>\$103,948 05</u>
	<u>\$103,948 05</u>

THUNDER BAY

Statement showing the amount to be paid by the City of Port Arthur as the cost—under section
sion from that Municipality on account of such cost—and the amount credited to
supplied to it in the year

Municipality	Interim Rate per Horse Power Collected by Commission during year	Capital Cost of System on which Interest and Fixed Chgs. are payable	Average Horse Power supplied in year after correction for power factor	Cost of Power to Commis- sion	Operating Operating, Main- tenance and Ad- ministrative Expenses
Port Arthur..	\$ c. 19 75 517.22 per month	\$ c. 118,452 67	5,468.3	\$ c. 81,945 00	\$ c. 8,963 08

Non-operating Capital—
Nipigon Power Development
and Transmission Line 4,001,968 02

 4,120,420 69

SYSTEM

23 of the Act—of power supplied to it by the Commission, the amount received by the Commission upon Port Arthur upon ascertaining by annual adjustment the actual cost of power ending 31st October, 1920

costs and fixed charges				Total Cost of Power for year as provided to be paid under Section 23 of Act	Amount paid to the Commission by the Municipality	Amount credited to Port Arthur upon ascertaining the cost of power by annual adjustment
Interest	Renewals	Contingencies	Sinking Fund			
\$ 5,395 44	\$ 4,145 32	\$ 1,367 07	\$ 2,132 14	\$ 103,948 05	\$ 114,199 64	\$ 10,251 59

THUNDER BAY SYSTEM

Reserve for Contingencies Account—31st October, 1920

Balance brought forward 31st October, 1919	\$2,776 36
 Added during the year ending 31st October, 1920:	
Amount charged to Port Arthur as part of the cost of power delivered to them	\$1,367 07
Interest at 4% per annum on the monthly balances to the credit of the account	111 05
	1,478 12
Balance carried forward 31st October, 1920	\$4,254 48

THUNDER BAY SYSTEM

Reserve for Renewals Account—31st October, 1920

Balance brought forward 31st October, 1919	\$34,210 09
Deduct expenditures to 31st October, 1919	9 75
 Added during the year ending 31st October, 1920:	
Amount charged Port Arthur as part of the cost of power delivered to them	\$4,145 32
Interest at 4% per annum on the monthly balances to the credit of the account	1,368 01
	5,513 33
Balance carried forward 31st October, 1920	\$39,713 67

THUNDER BAY SYSTEM.

Statement showing the Total Sinking Fund Requirements of the City of Port Arthur, Sinking Fund Payments made by it, and the Total of such Sinking Fund Payments, with interest allowed thereon, to October 31, 1920.

Statement showing the Net Credit to the City of Port Arthur in respect of Power Supplied to it to 31st October, 1919, interest added during the year; also the amount credited to Port Arthur in respect of Power Supplied to it in the year ending 31st October, 1920; and the accumulated amount standing as a credit to that Municipality at 31st October, 1920.

THUNDER BAY

Statement showing the total Sinking Fund requirements of the City of Port Arthur
with interest allowed thereon

Municipality	Sinking Fund Requirements	
	Period Covered	Amount
Port Arthur	10 years ending 31st Oct., 1920	\$ c. 17,437 40

THUNDER BAY

Statement showing the Net Credit to the City of Port Arthur in respect of Power supplied
Arthur in respect of Power supplied to it in the year ending 31st October, 1919,

Municipality	Date commenced operating	Net Credit at 31st October, 1919
Port Arthur	Dec., 1910	\$ c. 17,621 72

SYSTEM

Sinking Fund payments made by it, and the total of such Sinking Fund payments, to October 31, 1920

Sinking Fund Paid		Interest at 4% per annum allowed on Sinking Fund Payments	Total Sinking Fund Payments and Accumulated Interest to 31st October, 1920
Period Covered	Amount		
Full Period	\$ 17,437 40	\$ 3,009 58	\$ 20,446 98

SYSTEM

to it 31st October, 1919, interest added during the year; also the amount credited to Port and the accumulated amount standing as a credit to that Municipality at 31st October, 1920

Interest at 4% per annum credited during the year	Amount credited in respect of Power supplied in year ending 31st October, 1920	Accumulated Amount standing as a Credit on 31st October, 1920
\$ 704 87	\$ 10,251 59	\$ 28,578 18

CENTRAL ONTARIO SYSTEM

Operated by The Hydro-Electric Power Commission of Ontario—Statement of Assets and Liabilities—31st October, 1920

Assets.

<i>Central Ontario:</i>	<i>Liabilities.</i>
Power Development and Hydraulic Rights	\$4,508,528 73
Transformer Stations	1,084,472 00
Transmission Lines	1,714,513 37
<u>Local Utilities—Electric, Gas, Water and Street Railway.....</u>	<u>\$7,307,514 10</u>
Nipissing:	
Power Development and Steam Plant	\$363,297 90
Transmission Lines	43,322 00
Transformer Stations	35,492 22
<u>Local Utilities—Electric</u>	<u>442,112 12</u>
Rural Lines	170,678 73
Pulp Mill and Pulpwood Areas	30,812 16
	454,227 79
	<u>\$10,604,853 28</u>
<i>Investments:</i>	
Town of Trenton Debentures, re Sale of Water-works	20,352 04
Cash in Bank	4,590 32
<i>Inventories:</i>	
Tools and Equipment	50,631 09
Materials and Supplies	380,749 49
	<u>\$431,380 58</u>
Accounts Receivable:	
Power and Pulpmill Accounts	\$164,733 94
Consumers' Supply—Sales Accts	35,581 35
Consumers' Light and Power Accts	30,049 75
Less Reserved for Doubtful Accounts	230,365 04
	<u>8,209 43</u>
	<u>222,155 61</u>
Provincial Treasurer:	
Purchase Price of System	\$8,350,000 00
Debentures issued in connection with purchase of Bruton Township Pulpwood Area	225,000 00
Cash Advances	3,598,185 00
Accounts payable and accrued charges	\$217,458 25
Consumers' Deposits	7,146 85
Unearned Water Rates	2,200 00
Reserved for renewals	226,805 10
Reserved for contingencies	812,509 75
Reserved for Sinking Fund:	10,763 90
For retirement of bonds issued in purchase of Bruton Township Pulpwood Areas	18,803 52
For repayment of cost of mill at Bancroft	1,177 53
In respect of Rural Lines	<u>1,235 31</u>
	<u>21,216 36</u>

Due by The Hydro-Electric Power Commission of Ontario	\$1,719,472 22
Advances on contracts for pulpwood	11,904 42
Expenses and insurance prepaid	8,116 89
Deferred maintenance, <i>re</i> Insulation of Transmission Lines, chargeable to future operation	54,123 85
Operating deficit	167,530 90
	<hr/>
	\$13,244,480 11
	<hr/>

CENTRAL ONTARIO SYSTEM

Operating Account for Year Ending 31st October, 1920

Cost of Operations.

	<i>Cost of Operations.</i>	<i>Revenue.</i>
Power Department:		
Power purchased	\$14,492 35	Power sold to Private Companies and certain Municipalities and supplied the Peterborough Street Railway
Cost of operating and maintaining Generating Plants, Transmission Lines, Stations, etc., including rentals of Water Powers, and the proportion of Administrative expenses chargeable to the operation of the Power Department		Light and Power sold to consumers on the twenty Electric Light Distribution Systems
Interest on Capital Investment	317,806 79	Gas sold to consumers on four Gas Systems and the sales of by-products
Provision for renewal of Generating Plants, Lines, Stations, etc.	123,042 77	Water sold to consumers on the Water System.
Provision for contingencies	6,835 35	Revenue from Peterborough Street Railway
	<hr/>	<hr/>
Utilities:		Total revenue from Power Department and Utilities
		Net profit on sales of equipment and supplies
		Net profit for year on operation of Pulp Mill and Bruton Township Pulpwood Areas
		<hr/>
		Total revenue

Costs of operating and maintaining Electric Light Distribution Systems, Gas Systems, Water System, and the Peterborough Street Railway, including all materials and supplies purchased and the proportion of Administration expenses chargeable to the operation of these utilities..	410,608 42	\$1,266,203 83
Interest on Capital Investment...	132,768 39	45,144 72
Provision for renewal of plants and equipment	68,013 03	200,364 45
Provision for Sinking Fund	536 52	
	<hr/>	<hr/>
Total cost of operation of Power Department and Utilities		\$1,511,713 00
Net operating surplus for year		

Surplus Account

Debit balance brought forward October 31, 1919	\$191,389 34	Net operating surplus for year ending October 31, 1920	136,716 13
Deficit to October 31, 1919 (on both Hydro and Municipal Accounts) in respect of Oshawa Rural Lines, now transferred to Surplus Account	5,229 90	Balanc—as shown on Statement of Assets and Liabilities	167,530 90
Further provision for Water Rentals accrued for the period March 1, 1916, to October 31, 1919	107,627 79		
		\$304,247 03	

CENTRAL ONTARIO SYSTEM

Reserve for Renewals Account—31st October, 1920

Total provision for renewals to 31st October, 1919	\$611,650 76
Deduct:	
Expenditures to 31st October, 1919	6,491 83
Balance brought forward 31st October, 1919	605,158 93
Added during the year ending 31st October, 1920:	
By charges against operations	\$196,726 30
Interest at 4% per annum on the monthly balances to the credit of the account	24,295 06
	221,021 36
	\$826,180 29
Deduct:	
Expenditures during the year ending 31st October, 1920	13,670 54
Balance carried forward 31st October, 1920	\$812,509 75

Reserve for Contingencies Account—31st October, 1920

Balance brought forward 31st October, 1919	\$5,686 27
Added during the year ending 31st October, 1920:	
By charges against operations	\$6,835 35
Interest at 4% per annum on the monthly balances to the credit of the account	177 28
	7,012 63
	\$12,698 90
Deduct:	
Expenditures to cover contingencies met with during the year ending 31st October, 1920	1,935 00
Balance carried forward 31st October, 1920	\$10,763 90

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

Account with the Provincial Treasurer for the Year Ending 31st October, 1920

Oct. 31, 1920:			
Cheque to cover interest to date	\$2,767,263 07		
Nov. 1, 1919 to Oct. 31, 1920:			
Provincial expenditures	226,551 00		
Balance carried down	66,322,950 10		
Nov. 1, 1919:			
Balance Brought Down:			
General Account	\$25,517,816 10		
Chippawa Development Account. 11,075,000 00			
Central Ontario System Account 11,643,185 00			
		\$48,236,001 10	
Nov. 1, 1919 to Oct. 31, 1920:			
Sundry Cash Advances:			
General Account	\$6,261,500 00		
Chippawa Development Account. 11,285,000 00			
Central Ontario System Account 530,000 00			
Provincial Expenditures Account 237,000 00			
		\$18,313,500 00	
Oct. 31, 1920:			
Interest on balances from Nov. 1, 1919, to Oct. 31, 1920	2,767,263 07		
		\$69,316,764 17	
Nov. 1, 1920:			
Balance		\$66,322,950 10	

SECTION IV

ELECTRICAL ENGINEERING AND CONSTRUCTION

ONTARIO POWER COMPANY

In July the official acceptance tests were carried out on the two 15,000 kv-a. generators installed in 1919. Among other tests, one generator was short-circuited three times at full voltage, full speed, no load. Oscillograms were taken, starting at the instant of closing the control switch on the circuit-breaker and including the time of the short-circuit, the operation of the differential relays and the clearing of the short-circuit by the circuit-breaker. The complete cycle of operations of short-circuit and the clearing of the short-circuit was in this way obtained on the generator and its protective equipment.

A contract was placed with the Canadian Westinghouse Company in June for two complete armature windings for the 8776 kv-a. Westinghouse generators. On account of the severe service imposed on these machines since 1909 the armature insulation has about reached the end of its useful life. It is proposed to partially or completely rewind some of these generators as rapidly as operating conditions will permit.

During September a contract was made with the Standard Underground Cable Company, of Hamilton, Ontario, for the manufacture of 7,650 feet of 3 conductor, 350,000 c.m. 8/32 inch by 8/32 inch paper insulated, lead covered and armored cable for 12,000-volt service. This cable is intended to replace cables on three of the older generators which have been found unsuitable for the service. The new cables will be delivered in a few weeks, and will be installed at the first opportunity.

General engineering, arising out of the changing operating conditions throughout the year, has been carried on. Methods of improving the relay protection on the older sections of the plant were investigated.

QUEENSTON-CHIPPEWA DEVELOPMENT

Queenston Generating Station

During the year, the designing work on the Queenston Generating Station has been actively carried on, and further studies made of the many problems developing in the design, covering short circuit conditions, stability of operation, voltage regulation, relay protection, switchboard equipment, ventilation, fire protection and others.

Numerous conferences have been held with engineers of manufacturing companies to discuss the problems arising out of the design of a power plant of the magnitudes of this development. Visits have been made by the Commission's engineers to the factories of the following companies:

Canadian Westinghouse Company, Limited, Hamilton, Ontario; Canadian General Electric Company, Limited, Peterboro, Ontario; Canadian Porcelain Company, Hamilton, Ontario; Westinghouse Electric and Manufacturing Company,

Pittsburgh, Pennsylvania; General Electric Company, Schenectady, New York; Ohio Insulator Company, Barberton, Ohio.

Visits have also been made to large generating stations now operating, and discussions carried on with the engineers in charge of such stations.

The following paragraphs outline briefly the general layout scheme of the generating station, and cover the equipment ordered during the year.

The ultimate building will be 650 feet long, with the generator room 60 feet wide and 60 feet high. The transformer and switching sections will be 130 feet high and 60 feet wide. The generators will be spaced on 50-foot centres, and the same space will be devoted to the necessary switching equipment and power transformers comprising one complete unit every 50 feet. At each end of the station a section 75 feet long is devoted to service generators and equipment, machine and repair shops, stores, etc. The south half of the station only will be constructed at present.

The control room will be situated in the middle of the station above the generator room and overlooking the river. The present installation includes five generators with complete switching equipment. Their general characteristics were given in the last Annual Report.

Two generating units were ordered from the Canadian General Electric Company, Toronto, on February 26, 1920. These generators have the same rating as those ordered last year from the Canadian Westinghouse Company, Hamilton, i.e., 45,000 kv-a., 80 per cent., power factor, 12,000 volt, three phase, 25 cycle, 187.5 r.p.m., complete with thrust bearing, two guide bearings, direct connected exciter, voltage regulator and accessories. The contract dates for completion of these two units ready for operation are November 1, 1921, and March 1, 1922.

A third generating unit of the same rating was ordered from the Canadian Westinghouse Company, Hamilton, on February 26, 1920, and the contract completion date, ready for operation, is November 1, 1921.

Fifteen 15,000 kv-a. 12,000/63,500 volt single phase, water cooled transformers were ordered from the Canadian Westinghouse Company, Hamilton, on February 26, 1920. The contract dates for complete installation of these transformers are as follows:

- First Bank, June 1st, 1921.
- Second Bank—July 1st, 1921.
- Third Bank—August 1st, 1921.
- Fourth Bank—September 1st, 1921.
- Fifth Bank—December 1st, 1921.

On October 14, 1920, an order was placed with the Canadian Westinghouse Company, Hamilton, for two 2,200 kv-a., 500 r.p.m., 25 cycle, 2,300 volt generators, complete with direct connected exciters, field rheostats, water-cooled thrust bearings and all appurtenances. The first unit is to be installed ready for service by August 14, 1921, and the second unit by September 14, 1921.

These generators are to furnish power required to operate the plant auxiliaries, such as lighting, auxiliary heating, cranes, elevators, pumps, fans, reserve motor-driven exciters, etc.

Extensive studies have been made regarding the best system of station connections, so as to decrease the hazard of operating such large units, and at the same time to obtain the best operating conditions. Oil switches and bus supports

had to be developed to meet the extreme conditions, as it was found that there was no suitable apparatus on the market to meet the conditions.

An order was placed with the Canadian General Electric Company, Toronto, on August 19, 1920, for sixteen 3,000 ampere, 15,000 volt, three pole, electrically operated oil circuit-breakers. On August 20, 1920, an order was placed with the Canadian Westinghouse Company, Hamilton, for nine 3,000 ampere, 15,000 volt oil circuit-breakers, and, in addition, twenty 500 ampere, 165,000 volt three pole electrically operated breakers. All these breakers are of special design and have guaranteed rupturing capacity sufficient for opening short circuits when operating with eight generating units in parallel.

The contract delivery dates for the above oil circuit-breakers are as follows:

(a) Canadian General Electric Company:

15,000-volt oil circuit-breakers.

Three complete breakers by August 1st, 1921.

" " " " September 1st, 1921.

" " " " October 1st, 1921.

" " " " November 1st, 1921.

" " " " December 1st, 1921.

One " " " " January 1st, 1922.

(b) Canadian Westinghouse Company:

I. 15,000-volt oil circuit breakers.

Three complete breakers by April 1st, 1921.

Two " " " May 1st, 1921.

" " " June 1st, 1921.

" " " July 1st, 1921.

II. 155,000-volt oil circuit-breakers.

Three complete breakers by April 1st, 1921.

" " " May 1st, 1921.

Two " " " June 1st, 1921.

And two on the first of every subsequent month until twenty are delivered.

On September 16, 1920, the Canadian Bridge Company, Walkerville, were given the contract for supplying the superstructure steel, including all columns, girders, crane girders, rails and fastenings, trusses, beams, lintels, curb angles, bracing, grillages, stairwell and elevator shaft framing, ceiling hangers and ribs, brackets for architectural features, anchor bolts, field rivets and bolts, erection bolts, and all stairs, hand rails, ladders, etc. The contract date for completing the steel for the first five bays of the generator room is December 8, 1920, and the balance of the contract within six months.

Two 150-ton electrically operated cranes with equalizer lifting beam were ordered from the Dominion Bridge Company, Montreal, on March 31, 1920, complete delivery to be made by January 1, 1921. These two cranes are so designed that they will work independently or together. The equalizer lifting beam is to be used when lifting the 300-ton rotor of the main generators.

Specifications were issued on October 15, 1920, covering high voltage lightning arresters, and on October 21, 1920, covering current limiting reactors. Specifications are now under preparation covering the insulators and disconnecting switches for the high and low voltage wiring.

Montrose Distributing Station

The work of installing the three 500 k.w., 600-volt rotary converters and switching equipment which was started in August, 1919, was completed in February, 1920. This provides power for a section of the electric railways being used for the construction of the Queenston-Chippawa Development.

The pipe line for cooling water for this station, mentioned in the last Annual Report, was completed in January.

In August of this year it was found necessary to install an air compressor plant adjacent to Montrose Station, for the purpose of supplying compressed air for construction work on the Queenston-Chippawa Development. In order to supply power for the compressors it was decided to install one 1,500 kv-a. 3-phase 13,200/4,000-volt transformer and nine 200 kv-a. 4,000/575-volt transformers in Montrose Station. When the original station was built provision was made for this additional installation; therefore it was not necessary to add any additional building. An order was placed in August with the Moloney Electric Company of Canada for the nine 200 kv-a. transformers, and the 1,500 kv-a. 3-phase transformer was obtained from our stock. Construction work on this installation was started by the Commission's Construction Department in September, and it is expected that the work will be completed in November. When this addition is completed, this station will contain three 1,500 kv-a. 3-phase 12,000/4,000-volt transformers; three banks, each consisting of three 200 kv-a. 4,000/575-volt transformers; and three banks, each consisting of three 165 kv-a. 12,000/430-volt transformers which are used with the three 500 k.w. 600-volt direct current rotary converters. There are three 600-volt direct current feeders, and four 4,000-volt alternating current outgoing feeders with the necessary switching equipment. The 575-volt power is used entirely in the compressor plant.

NIAGARA SYSTEM

NIAGARA TRANSFORMER STATION

Additional Transformer Equipment

The installation of the three 75 kv-a. 12,000/575-volt transformers for station service, mentioned in the last Report, was completed and put into service in June, 1920.

The bank of three 3,500 kv-a. transformers, which were installed as No. 4 bank 46,000 volts, has been reconnected and necessary changes in the bus and switching equipment made, so as to operate as 110,000-volt transformers. This work was completed and put into service as No. 9 bank 110,000-volt transformers in January of this year.

Switching and Bus Equipment, 12,000 Volts

In order to provide additional strength to the 12,000-volt buses for the feeders from the Ontario Power Company and for the 110,000-volt transformers, all the bus supports which were installed in the original installations on these buses are being removed and replaced with heavy type bus supports. This work has been carried on during the past year, and it is expected that this work will be completed during the latter part of the year. Also all connections to these buses are being taped so as to provide additional protection. Wherever possible, all the

12,000-volt buses are being enclosed by installing barriers over openings in the structures.

A Westinghouse type "C" 12,000-volt oil circuit-breaker was installed between No. 11 and 12 Ontario Power feeders on the Ontario Power bus to supply power to No. 9 bank of 110,000-volt transformers. Also a similar type circuit breaker was installed between No. 8 and 9 Ontario Power feeders on this bus to supply power to the new banks of station service transformers. All the 12,000-volt oil circuit-breakers which were installed in the original station have now been removed, and replaced by oil circuit-breakers of improved design and greater rupturing capacity.

A set of three Metropolitan Company reactors have been installed between the north end of the Canadian Niagara Power main 12,000-volt bus and the Ontario Power bus. This provides an alternative connection for supplying power from the Canadian-Niagara Power Company to the 110,000-volt transformers.

Switching Equipment, 110,000 Volts

In order to provide additional carrying capacity and switches of improved design to meet the operating conditions, the 110,000-volt disconnecting switches which were originally installed on No. 1, 4, 5 and 8 banks of 110,000-volt transformers and on the 110,000-volt main bus tie breaker are being removed and replaced with 400-ampere disconnecting switches with extra heavy pillar-type insulators.

Switchboard

The totalizing metering equipment which was mentioned in last year's Report has now been completed. The equipment measures on separate meters the total power received on the 12,000-volt feeders from the Ontario Power Company and the Canadian Niagara Power Company, and also the total power delivered to the 46,000-volt lines and 110,000-volt lines.

Water and Oil Systems

In order to provide a supply of water to Montrose Distributing Station a pump has been installed in this station for supplying water from the Niagara Station water system to a pipe line running to Montrose Distributing Station.

During the past year two 600-gallon oil tanks have been installed in the basement, for the purpose of storing circuit-breaker oil.

General

For the purpose of providing a satisfactory disposal of the drainage a sump is being built to the south-west of the station, into which all building and ground drains will empty. A pump is being installed in a pump-house adjacent to the sump, which shall automatically pump the drainage to the drain running from this station to the Ontario Power Company drains. This work was started in September, and will be completed before the end of the year.

A section of the gallery above the control room has been partitioned off, which provides a lunch room for the men employed in the station. This room has been equipped with tables, chairs, lockers and an electric stove.

Due to the damaged condition of the walls of the 12,000-volt cable tunnel in the south section of the basement, the wall and ceiling are being removed and replaced with reinforced concrete.

Niagara-on-the-Lake Municipal Station

In December, 1919, it was decided to remove the curve drawing wattmeter which was installed in this station to measure the incoming power, and to replace it by a Westinghouse graphic recording wattmeter and a recording reactive volt-ampere meter. These meters were received in the early part of the year, and their installation was completed by the Commission's Construction Department in May, 1920.

Niagara Falls Municipal Station

At the request of the Hydro-Electric Commission of Niagara Falls, engineering assistance is being given to them covering the inspection and tests on one 1,500 kv-a. 3-phase, 13,200-volt transformer which they have ordered from the Canadian Crocker-Wheeler Company. Also plans are being prepared by the Commission for the temporary installation of this transformer.

Port Colborne Distributing Station

In order to provide additional power to the Municipalities of Port Colborne and Humberstone, it was decided in the early part of the year to purchase and install additional transformer capacity at Port Golborne Station. This work is being accomplished by purchasing three 150 kv-a. 13,200/2,200-volt transformers from the Municipality of St. Mary's and installing them in the Port Colborne 30,000-volt station. The switching and metering equipment is being removed from the former 12,000-volt station, and is being installed with the 150 kv-a. transformers. A 4,000-volt cable has been laid across the canal to supply power to Port Colborne, on the west side of the canal. Humberstone will be supplied on the west side by means of the submarine cable which was installed some time ago. Complete switching and metering equipment has been installed on the 2,300-volt feeders, so that Port Colborne and Humberstone loads will be supplied and metered separately. This installation is being made temporarily in the spare transformer pocket in this station, and when conditions warrant it a station may be built for supplying power to these municipalities. This work has been practically completed, and it is expected it will be finished by the middle of November.

DUNDAS

Line Breakers

The installation of heavier capacity 110,000-volt oil circuit breakers on the lines out of Dundas Station mentioned in the last Report was completed in February, 1920.

The installation of Westinghouse graphic recording totalizing meters mentioned in the last Report was completed in November, 1919.

It was considered advisable to have better relay protection than that afforded by the straight overload relays for the power transformers in this station. Plans were made up and instructions issued in April, 1920, to install differential relays for these transformers. This installation was completed by the Commission's Construction Department in June, 1920.

It was decided to increase the capacity of the 110,000-volt oil circuit breaker feeding transformer bank No. 1 in this station by replacing the present Canadian Westinghouse type "GA" flat top breaker by a Canadian Westinghouse plain round tank breaker. Plans were prepared showing this change and instructions

issued to proceed with this work in October, 1920, and it is expected that the installation will be completed by the end of the year.

The water supply for transformer cooling was found to be inadequate and arrangements were made to supplement it by obtaining water from the Desjardins Canal. A small open channel was constructed from the canal to a settling tank on the Commission's property. The water runs from this tank through an 8-in. tile drain to the present outside well in which the water pumps are located. This work was done by the Commission's Construction Department, being completed in April, 1920.

The original septic tank proving inadequate, a larger tank was installed with better distributors, the work being completed in April, 1920.

Caledonia Distributing Station

The recording reactive volt-ampere meter mentioned in the last Report was put into service on January 31st.

Dominion Sewer Pipe Company's Distributing Station, Waterdown

The changes in the metering equipment on the Dominion Sewer Pipe feeder and the Waterdown feeder in this station referred to in the last Report were completed and the new equipment placed in service on April 23, 1920.

Hagersville Distributing Station

The recording reactive volt ampere meter and accessories mentioned in the last Report were placed in service on February 4th.

Lythmore Distributing Station

The recording reactive volt ampere meter and accessory equipment mentioned in the last Report were placed in service on February 7th.

Wood Milling Company, Copetown

The recording wattmeter and accessories mentioned in the last Report were placed in service on November 11, 1919.

Lynden Distributing Station

The recording reactive volt ampere meter and equipment mentioned in the last Report was placed in service on April 23rd.

TORONTO TRANSFORMER STATION

Differential Protection for Transformers

It was decided to install differential relay protection on each of the five banks of power transformers using H.E.P.C. air insulated current transformers on the high tension side. Overload relays (Canadian Westinghouse Company type "CO" on banks No. 1 and 2 and Condit type "A" on banks Nos. 3, 4 and 5) are provided to trip 110,000-volt transformer switches in case of sustained overloads while differential relays (Canadian Westinghouse Company type "B" and type "M" multi-contact) are provided to trip both the 110,000-volt switches and the two 13,200-volt switches on each bank in case of a breakdown in the bank.

As there was not sufficient room on the main switchboard for the relays it was decided to mount them on small ebony asbestos panels mounted on the wall near the oil switches in the high tension room. Instructions have been issued to Construction Department to do this installation. It will be completed early in 1921.

Annunciator

The installation of the annunciator referred to in the last Report to indicate which oil circuit breakers have opened automatically is now completed.

Synchronous Condensers

In the last Report it was noted that the stator of No. 2 condenser was being rewound by the Canadian General Electric Company at Peterborough. The re-winding was completed in November, 1919, and the condenser was placed in service on November 28, 1919.

In May, it was decided to have No. 1 condenser rewound, the new winding being designed to increase the capacity from 4,000 to 5,000 kv-a. and on May 7th the contract for the new coils and for the work of rewinding the armature was awarded to the Canadian General Electric Company. It is expected that the stator will be shipped to Toronto early in November and that the condenser will be in service again in December.

LONDON TRANSFORMER STATION

The three 1,250-kv-a. core type transformers which had been released from service at London Transformer Station were shipped to Woodstock Transformer Station in November, 1919, and three 2,500-kv-a. transformers from Toronto Transformer Station were temporarily installed in No. 2 pocket. The installation of the switching equipment for No. 3 transformer bank was completed in March, and on March 21st the three 2,500-kv-a. transformers were removed from No. 2 pocket and connected up permanently in No. 3 pocket. The switching equipment for No. 2 bank has been left in place, no changes being made in any of the connections.

The changes in the switching equipment and connections of No. 1 bank to accommodate the 2,500-kv-a. transformers, including the installation of the totalizing metering equipment and the differential relay equipment, were completed in July.

In February, it was decided to replace two sets of disconnecting switches in the 110,000-volt bus with a new type of switch of larger capacity. However, due to difficulty in arranging interruptions the work was not completed until October 24th. The work was carried out by the Construction Department of the Commission.

In May, arrangements were made to build a septic tank at this station. The work was done by the Construction Department of the Commission and was completed in September.

Synchronous Condenser

In April, the decision was made after careful investigation to install at London the 10,000-kv-a. synchronous condenser which was ordered from the Canadian General Electric Company as noted in the last Report. To accommodate

this condenser, a temporary building has been erected at the north-east corner of the transformer station, this building being constructed of corrugated iron sheeting on a wood frame.

The switching equipment purchased for the control of the condenser, includes three 13,200-volt oil circuit breakers, and one electrically operated field switch ordered from Canadian Westinghouse Company, 13,200-volt bus wire supports ordered from Ferranti Meter and Transformer Manufacturing Company and instruments and switchboard apparatus ordered from A. H. Winter-Joyner, Limited, and from Canadian General Electric Company.

The installation of the switching equipment is practically completed and will be ready for service in November. Shipment of the condenser was delayed due to manufacturing conditions but it will be shipped early in November, and it is expected will be placed in service during December.

Ailsa Craig Distributing Station

The new station installation mentioned in the last Report for the Ailsa Craig feeder was completed and placed in service on May 3rd. The equipment for the Parkhill feeder was placed in service on June 9, 1920.

Exeter Distributing Station

Owing to the unsatisfactory operation of the original overload relays on the incoming lines and on the Exeter, Hensall, Zurich and Dashwood feeders, they were replaced by single pole type, "PQ" Canadian General Electric Company's inverse time overload relays in September, 1920. Dry cells were installed to obtain a 12-volt D.C. tripping circuit for the breakers.

For additional safety of the attendant, screens were installed around the high tension lightning arrester in May, 1920.

The recording reactive volt-ampere meter and necessary equipment mentioned in the last Report were installed and placed in service in May, 1920.

London Municipal Station

The switching equipment mentioned in the last Annual Report for the extension to Horton Street Station, was shipped by the Canadian Westinghouse Company in March, but will not be installed until some time in 1921.

Thorndale Distributing Station

A Westinghouse graphic wattmeter was installed in this station in April, 1920, to measure the load taken by the municipality.

A Lincoln indicating demand meter and a Chamberlain & Hookhan watt-hour meter were installed in September, 1920, in the plant of Mr. W. H. Dellar, which is supplied from Thorndale Distributing Station.

GUELPH TRANSFORMER STATION

No electrical construction work was done on this station during the year.

Acton Distributing Station

The recording reactive volt-ampere meter mentioned in the last Report was put into service March 9, 1920.

Cheltenham Distributing Station

The recording reactive volt-ampere meter referred to in last year's Report was put into service in March, 1920.

Elora Distributing Station

The recording reactive volt-ampere meter mentioned in the last Report was installed and put into service on January 2, 1920.

Fergus Distributing Station

The recording reactive volt-ampere meter on the Fergus feeder mentioned in the last Report was put into service on January 3, 1920.

On account of the increase of the load on this station, the capacity of the current transformer on the feeder was increased from 30/5 amperes to 100/5 amperes. This work was completed in October, 1920.

Georgetown Distributing Station

The recording reactive volt-ampere meter on the Georgetown feeder in this station was put into service on March 23, 1920.

Guelph Military Hospital (Formerly Central Prison Farm)

The recording wattmeter and the reactive volt-ampere meter referred to in the last Report were installed and put into service on March 22, 1920.

Ontario Agricultural College, Guelph

The installation of the recording wattmeter and the recording reactive volt-ampere meter at this distributing station as mentioned in the last Report was completed and the equipment put into service on February 11, 1920.

Rockwood Distributing Station

The Siemen's demand meter in this station was replaced by a Canadian Westinghouse graphic recording wattmeter. This equipment was put into service on April 2, 1920.

PRESTON TRANSFORMER STATION

Metering Equipment

The totalizing metering equipment mentioned in the last Report was completed and put into service on December 24, 1919.

Estimates

Estimates were prepared and submitted to the Local Commissions at Preston and Hespeler for changing their municipal stations from 6,600 volt to 13,200 volt incoming power to enable the balance of the Preston Transformer Station to be changed to 13,200 volt.

An estimate was prepared and submitted to the R. Forbes Company, Hespeler covering the changing of their supply voltage from 6,600 volts to 2,200 volts.

An estimate was prepared and submitted to Doon Mills Company for changing their voltage from 6,600 volt to 13,200 volt, with an alternative estimate for 550 volts service to be obtained by tapping the Doon line on the 4,000 volt Breslau feeder and installing a bank of 2,200/550-volt transformers at Doon.

KITCHENER TRANSFORMER STATION

Totalizing Equipment

The installation of the totalizing recording meters mentioned in the last report was completed, and the equipment put in service on January 21, 1920.

Increased Capacity

Due to increasing load on this station it was decided to replace the bank of 750-kv-a. transformers by a bank of 2,500-kv-a. transformers. Accordingly a contract was placed with the Canadian General Electric Company for four 2,500-kv-a. 63,500 to 26,400/13,200-volt single-phase water-cooled transformers for the station. Plans were made showing changes in electrical equipment necessary for the larger transformers and also for the installation of differential relay protection on both transformer banks and material ordered and instructions issued to the Construction Department to install same. Owing to the difficulty experienced in obtaining raw material for the transformers they will not be delivered until December, 1920, so that the installation cannot be completed until after that time.

To accommodate the larger transformers the main station door was enlarged and the transformer rails in the erection room moved. The transformer truck was also strengthened to increase its carrying capacity. It was found necessary to increase the capacity of the 13,200 volt feeders in this station. Instructions have been issued to the Commission's Operating Department to change the capacity of the current transformers and wattmeters on these feeders to suit new load conditions, and it is expected this work will be completed in December of this year.

Kitchener Municipal Station No. 2

In March the Kitchener Light Commissioners authorized us to proceed with plans and specifications for a new substation to be erected at the corner of Breihaupt and Edward streets, Kitchener, in line with sketches which had been submitted to them earlier in the month.

The station will be a one-storey brick building 35 feet by 20 feet by 20 feet high, with provision for two incoming 13,200-volt lines, three 1,500-kv-a. three-phase transformers, and six 2,300-volt outgoing feeders.

The station will be fed at present by one incoming 13,200 volt line through Canadian Westinghouse choke coils disconnecting switches, and a type "G. A. 3" oil circuit breaker. The proposed transformer equipment will at first consist of one bank of 500 kv-a., single phase, 25-cycle, 13,200/2,200-volt Canadian General Electric transformers, which are to be moved from the No. 1 Municipal Station. These transformers will be connected through disconnecting switches to the 13,200 volt bus, and through Canadian Westinghouse type "B-2" oil switches to the 2,300-volt bus. The low-tension switching equipment will consist of three 2,300-volt feeders, which are to be run out underground to the pole structure on Breihaupt Street. A 2,300-volt emergency bus, by which the feeder oil switches may be cut out of service for repairs, is also to be installed.

The metering equipment will consist of Weston ammeters on all low tension feeders, a Weston voltmeter, and a Westinghouse recording wattmeter and recording reactive volt-ampere meter to read the total power on the incoming 13,200-volt line.

Contract for the building was placed by the local Commission with Messrs. Dunker Bros., Kitchener, Ontario, in July, and will be completed early in November,

1920. The contract for the switching equipment was placed with the Canadian Westinghouse Company in July to be delivered in November, 1920. All the installation work inside the station, with the exception of locating the power transformers, will be done by the Commission's Construction Department. The power transformers are to be installed by the Kitchener Light Commissioners.

It is expected that this station will be ready for service early in 1921.

Waterloo Municipal Station

Due to the ever increasing load on this station the local Commission decided to increase the capacity of their station, and asked for plans and estimates on the necessary extensions. The estimate of the cost of necessary extension and changes was submitted in November, 1919. In December authorization to proceed with the extension was received, and building plans and electrical layout plans were prepared and submitted for approval.

Building

The building extension is approximately 38 feet 6 inches long, 24 feet wide, and 20 feet high, inside dimensions. It is built on the west part of the south wall of the present transformer station, with the present boiler-room wall forming the east wall of the extension, and is of white brick, to conform with the present building. It is designed to accommodate two 13,200-volt incoming line equipments, three 1,500-kv-a. and two 750-kv-a. 13,200-volt/2,300-volt 3-phase O.I.W.C. transformers, with space for transformer erection. A large archway connects the present station with the extension. In the southwest corner of the extension is a small tower extending approximately 10 feet above the building. This tower is supplied with a 10-ton chain hoist, supported in the centre of the tower for lifting the cores out of the transformers. Rails supported on I beams, 15 inches above the main floor, are provided to support the transformers. Running in front of the transformer pockets is a track runway level with the floor, on which is a 25-ton transformer truck.

The plans and specifications for the building were made by the Commission and submitted to the local Commission, who had the building constructed by a local contractor.

Electrical Equipment

The station will be fed by two 13,200-volt lines connected through Canadian Westinghouse, type "G. A. 3" oil circuit breakers, to a bus, from which connections are taken through disconnecting switches to three 750-kv-a. O.I.W.C. 26,400/13,200-volt to 2,300-volt transformers.

The present electrical equipment in the old station will be changed and rearranged by removing the two banks of 150-kv-a. transformers and all the 13,200-volt equipment from the present station and re-arranging the low-tension equipment. The low-tension oil circuit breakers are all to be remote control hand-operated and mounted on pipe framework, on which will be mounted the low-tension buses and regulator bus, with space left for emergency low-tension buses.

The low-tension equipment is being purchased by the local Commission from the Canadian Westinghouse Company, with the exception of the auto starter for the synchronous condenser and three 13,200-volt choke coils, which are being purchased from the Canadian General Electric Company.

The installation work will be done by the Commission's Construction Department, assisted by the local Commission, and will be completed early in 1921.

Elmira Distributing Station

The three 150-kv-a. transformers and changes in equipment mentioned in the last report were put in service on January 23, 1920.

The three 75-kv-a. transformers which they replaced were taken out and shipped to Ailsa Craig Distributing Station in January, 1920.

The Westinghouse graphic wattmeter and recording reactive volt-ampere meters mentioned in last report were put into service on February 10.

St. Jacobs Distributing Station

The graphic wattmeter was re-connected from 500 to 110-volt type, and another potential transformer was supplied for it.

An extra ground wire was installed and all ungrounded equipment connected to it.

Baden Distributing Station

Westinghouse recording reactive volt-ampere meters and equipment for same for the Baden and Wellesley feeders mentioned in the last report were placed in service in April, 1920.

The three 150-kv-a. 13,200/2,300-volt, 25-cycle single phase transformers were inspected, and extra bracing of the core and coils installed and transformers replaced in service in May.

Petersburg and St. Agatha

Metering Equipment

The maximum demand meter was replaced on November 27, 1919, by a Westinghouse graphic wattmeter.

New Hamburg Distributing Station

The recording reactive volt-ampere meter mentioned in last report was installed and put into service on June 2, 1920.

STRATFORD TRANSFORMER STATION

The installation of the equipment mentioned in the last report for changing the 110,000-volt and 26,400-volt oil circuit breakers from hand-operated to electrically-operated type, including the installation of the storage battery and the moving of the switchboard to the new control room, was completed in March. The motor-operated deep-well pump was installed in January, but was not placed in service until April 7, 1920.

In March it was decided to provide differential protection for the transformers in this station. The 110,000-volt and the 26,400-volt current transformers which were required were manufactured by the Commission. The installation of this equipment was carried out by the Construction Department of the Commission, and was completed in September.

Listowel Distributing Station

The installation of three 200 kv-a. transformers in this station, as mentioned in the last report, was completed, and the equipment put into service on March 14th. The recording reactive volt-ampere meter was also put into service on the same date.

Clinton Municipal Station

The changes in the metering equipment in this station mentioned in the last report were completed and the equipment put into service on July 3.

Seaforth Municipal Station

The changes in the metering equipment in this station were completed, and the equipment put into service on May 5.

Following a suggestion by the Commission that the grounding of the apparatus in their station be improved, the Public Utilities Commission of Seaforth wrote on June 25 requesting the Commission to have the work carried out. This work was done by the Construction Department of the Commission, and was completed in August.

Mitchell Municipal Station

The recording reactive volt-ampere meter mentioned in the last report was put into service on July 5.

Tavistock Distributing Station

The recording reactive volt-ampere meter mentioned in the last report was put into service on April 30.

The bracing of the core and coils on the three 75-kv-a. transformers in this station was strengthened by the Commission's Operating Department. This work was completed on June 10.

Goderich Municipal Station

In order to obtain a more accurate indication of the load on this station, it was decided in December to purchase from the Local Commission the original metering equipment, consisting of curve-drawing wattmeter and power-factor meters with instrument transformers, and to replace the meters with Westinghouse recording wattmeter and recording reactive volt-ampere meters. This was done, and the new equipment put into service on May 9.

Milverton Distributing Station

The recording reactive volt-ampere meter and equipment mentioned in the last report were placed in service in April.

The relays on the feeder were replaced in September by single-phase Canadian General Electric type "PQ" relays, in order to improve the protection on this feeder.

Harriston Distributing Station

Owing to the unsatisfactory operation of the instantaneous and definite time relay combination on the feeder, these relays were replaced in September by three single-phase Canadian General Electric "PQ" inverse time overload relays.

The importance of the load on this feeder demands that a recording reactive volt-ampere meter and necessary equipment for same be installed. This will be done early in the new year.

Palmerston Distributing Station

The relays in Moorefield and Palmerston feeders were replaced in September by six single-phase Canadian General Electric "PQ" relays.

A recording reactive volt-ampere meter will be installed on the town feeder early in the new year.

ST. MARY'S TRANSFORMER STATION

Installation of totalizing meters for measuring total station load at 13,200 volts, and the installation of Westinghouse graphic wattmeter and reactive volt-ampere meter on the St. Mary's 13,200-volt feeder mentioned in the last report, were completed and put in service on December 22, 1919.

The 150-kv-a. transformers belonging to the Municipality of St. Mary's, which were located in the service-room at this station, were removed; also the 13,200-volt feeder across the ceiling connecting to same. The St. Mary's 13,200-volt feeder was changed to connect to a new line to the new electrical installation in the Municipal Pumping Station, to which the 2,300-volt Municipal feeder panel was removed.

The positions of the St. Mary's feeder and the St. Mary's Portland Cement Co.'s feeder were interchanged in order to avoid crossing the lines on the poles outside the station. This work was accomplished in September, 1920.

St. Mary's Municipal Station

Owing to the increased power demand at St. Mary's the local Commission decided to purchase larger transformers, and have them installed in the local pumping station, with necessary switching equipment. They accordingly purchased two 750-kv-a. three-phase oil-insulated, water-cooled Canadian General Electric Company 13,200 to 2,300-volt transformers from the Walkerville Hydro-Electric System, and had one of them placed in the pumping station. The other one is to be delivered later. At the request of the St. Mary's Commission, engineering assistance was given in connection with the new electrical installation in the pumping station and changes in the present low-voltage layout. Plans were prepared for the new installation, and the necessary new material was ordered from the Canadian Westinghouse Company. The Commission's Construction Department, assisted by the local Superintendent, installed the equipment, which was placed in service in August, 1920.

The three 150-kv-a. single-phase O.I.S.C. 13,200-volt to 2,300-volt Municipal transformers which were installed in the St. Mary's High-Tension Station, were purchased and shipped to Port Colborne. The low-voltage feeder panel removed from the Commission's Transformer Station was installed in the local pumping station.

WOODSTOCK TRANSFORMER STATION

Metering Equipment

Totalizing meters mentioned in last report were installed and placed in service on January 29, 1920.

High Tension Line Tap

It was considered advisable to sectionalize the second high-tension line at this point and connect same into this station. This was accomplished by installing six outdoor disconnecting switches on a pole structure, with taps off between these switches carried through disconnecting switches and standard entrance bushings into the station and attached to the high-tension buses. This installation was done by Commission's Operating Department, and was completed and placed in service in May, 1920.

Increased Capacity

Due to increased load on the station, it was decided in December, 1919, to increase the transformer capacity of station. The three 1,250-kv-a. 63,500/13,200-volt single-phase Canadian General Electric Company transformers were removed from London Station and installed in this station, replacing the three 750-kv-a. transformers which were originally there. One of the 750-kv-a. transformers was shipped to St. Thomas Transformer Station, two were stored outside the station, the present spare transformer being left in the station.

Transformer Protection

Differential relay protection for these transformers was also installed. The installation work was done by the Construction Department, being placed in service in December, 1919.

Woodstock Municipal Station No. 2

At the request of the Woodstock Water and Light Commission in June, engineering assistance was given in connection with the purchase of three 300-kv-a. single-phase, 25-cycle oil-insulated self-cooled 26,400-13,200/2,300-575-volts transformers. These were purchased from the Packard Electric Company by the local Commission on recommendation of the Provincial Commission, and are to be delivered in January, 1921.

Beachville Distributing Station

The installation of the additional metering equipment in the station mentioned in the last report was completed, and the equipment put into service.

Norwich Distributing Station

The three 75-kv-a. Packard transformers recorded as being purchased in the last report were installed in this station, replacing three 50-kv-a. Siemens' unit. The work was completed, and the new transformers put into service on April 1, 1920. The new metering equipment mentioned in the last report was put into service; the wattmeter on November 19, 1919, and the reactive volt-ampere meter on June 10, 1920.

As a safeguard against accidental contact, screens were placed around the high-tension arrester and oil switch. This work was completed on September 29, 1920.

In order to improve the ventilation in this station, louvers were installed in the doors, the work being completed on May 31.

Otterville Metering Station

In order to improve the metering records, the original demand meter at this station was replaced on November 22, 1919, by a Westinghouse graphic wattmeter.

Tillsonburg Municipal Station

At the request of the local Commission at Tillsonburg we inspected and tested at the shop of the Canadian General Electric Company three 250-kv-a. single-phase transformers with transfer switches which had been purchased by the local Commission.

The recording reactive volt-ampere meter mentioned in the last report was put into service on June 11, 1920.

Burgessville Metering Station

The original graphic wattmeter in this installation was replaced by a Canadian Westinghouse graphic wattmeter in a larger box. This work was completed on November 21, 1919.

ST. THOMAS TRANSFORMER STATION

Metering Equipment

The totalizing recording meter installation mentioned in last report was completed in January, 1920.

Foot Bridge

The construction of an extension on the London and Port Stanley railway bridge across Kettle Creek to form a foot bridge for the convenience of the operators in going to and from Transformer Station, was completed in April.

Rotary Converters

It was finally decided not to install the flash barriers on the three 500-kv-a. rotary converters, as mentioned in last report. A high-speed circuit breaker is to be used instead of flash barriers to trip out on sudden heavy surges. This breaker has been purchased from the Canadian General Electric, and will be installed in St. Thomas early in 1921.

Spare Transformer

One Canadian General Electric 750-kv-a. single-phase 63,500/13,200-volt water-cooled transformer, recently released from Woodstock Transformer Station, was installed in this station as a spare in February, 1920. Due to the insufficient supply of water for cooling the transformers, arrangements were made to drill a well to obtain more water, but the well will not be completed until November. In the meantime a small cooling tower was erected in the cooling pond in September to assist in cooling the water as it comes from the transformers.

St. Thomas Municipal Station

In February the local Commission requested engineering assistance in connection with the installation of a 2,300-volt feeder panel, and equipment for the control of the waterworks feeder.

In order to line up with the present equipment the panel was ordered from the Canadian Westinghouse Company. This will be delivered about November, so that the installation will be completed before the end of the present year.

In September the local Commission requested engineering assistance in connection with the purchase and installation of the necessary metering and switching equipment for the spare 750-kv-a. three-phase transformer in this station.

This equipment is being purchased from the Canadian Westinghouse Company, but owing to the long delivery given on both the high and low tension equipment the installation will not be completed until the early part of 1921.

Aylmer Distributing Station

The installation of the recording reactive volt-ampere meter mentioned in the last report was held up, and will not be completed until early in 1921.

Protective screens were installed around the Siemen's lightning arrester in May, 1920.

Dutton Distributing Station

The recording reactive volt-ampere meter mentioned in the last report was put in service on June 8.

Port Stanley Distributing Station

The third 75-kv-a. transformer mentioned in last report was repaired and placed in service in February, making a bank of three 75-kv-a. transformers. The two 50-kv-a. Siemen's transformers which were used temporarily in parallel on one leg of the delta bank in this station were removed and shipped to the Commission's Stores, Toronto.

The installation of Canadian Westinghouse recording reactive volt-ampere meter on the Port Stanley feeder, mentioned in last report, was completed in June. In August, screens were installed around the high-tension arrester.

In August authorization was given to increase capacity of station to 300-kv-a. in order to meet summer load. This will be done early in the new year.

BRANT TRANSFORMER STATION

Installation of the four Canadian Westinghouse Company 2,500-kv-a. transformers and of the differential relay protection mentioned in last report was completed on April 11, 1920.

The ground-detector equipment mentioned in last report was completed and put into service on the same date.

The operator's cottage mentioned in the last report was completed in January.

Two alarm bells were installed in operator's cottage on September 2, 1920, one to ring when a high-tension switch trips out, and the other to ring when a low-tension switch trips out.

The Canadian Westinghouse Company type "OA" current transformers, 50-25/5-5 amperes on the Brantford feeders (No. 1253 and No. 1254) were re-wound for 100-50/5-5 amperes by the Operating Department. This work was completed and the transformers returned to service in May, 1920. In order to accomplish this, the two current transformers (30-15/5-5 ampere) on feeder No. 1256 were re-wound for 60-30/5-5 ampere ratio to use in feeders No. 1253 and No. 1254, while the respective current transformers were being re-wound.

A 110,000-volt switching structure, sectionalizing high-tension lines C2 and D2, and tapping these lines through disconnecting switches into Brant Station, was installed by Operating Department and placed in service on May 22, 1920.

G. W. Macfarlane Engineering Company, Paris

Metering Equipment

In order to meter the power delivered to the G. W. MacFarlane Engineering Company at 550 volts, a metering equipment was installed at their plant. A graphic wattmeter was purchased from the G. W. MacFarlane Company and a graphic reactive volt-ampere meter, two 160/5-ampere current transformers, and two 500/100-volt potential transformers were purchased from the Canadian Westinghouse Company. This equipment was put into service on July 9, 1920.

Simcoe Municipal Station

The recording reactive volt-ampere meter mentioned in the last report was placed in service on June 4, 1920.

Waterford Distributing Station

The recording reactive volt-ampere meter mentioned in the last report was put into service on July 4.

Wolverton Milling Company

Metering Equipment

On account of the importance of the load at the Wolverton Milling Company's plant at Wolverton, Ontario, a recording reactive volt-ampere meter was purchased and installed, being put into service on July 13.

COOKSVILLE TRANSFORMER STATION

The station totalizing metering equipment mentioned in our last report was installed by the Commission's Operating Department, and placed in service in January, 1920.

The differential relay protection for the power transformer bank, referred to in the last report, was installed by the Commission's Construction Department. The work was completed and the equipment placed in service in August, 1920.

Etobicoke Distributing Station

The operator's cottage mentioned in last report was completed in December, 1919.

Owing to the growth and importance of the load in this district, one Canadian Crocker Wheeler 1,500-kv-a. three-phase, 25-cycle O.I.W.C. 45,700/26,400/13,200 volts to 2,300/575 volts transformer, was shipped from Welland Municipal Station and installed in position in the station as a spare in March, 1920.

In February, authorization was given to purchase and install one 1,500-kv-a. three-phase, 25-cycle, 26,400-13,200/4,000-2,300-575-volt O.I.S.C. transformer, together with the necessary high-tension and low-tension switching equipment.

The transformer was purchased from the Canadian Westinghouse Company, and will be installed by the Commission's Construction Department. The switching equipment was purchased from the Canadian General Electric Company, who are to install the same. This work will be completed early in 1921.

In order to facilitate the operation of this station with one operator, an alarm bell was installed in the operator's cottage in July. This bell is connected up to ring when any low-tension oil breaker opens automatically or when the temperature of the power transformers becomes too high.

Arrangements are being made to install a Canadian General Electric graphic recording wattmeter on the service load early in 1921.

Mimico Distributing Station

The bracing of the core and coils of the 150-kv-a. transformers was strengthened by the Operating Department.

In order to improve the power records of this station, the curve-drawing wattmeter on the Mimico feeder was taken to Stores, and Westinghouse graphic watt-

meters and reactive volt-ampere meters were installed on the Mimico and Etobicoke Township Feeders.

This equipment was placed in service on June 5, 1920.

Port Credit Distributing Station

The removal of the wattmeter on the outgoing feeder in this station from the Toronto Township 4,000-volt outgoing feeder to Toronto Stores, and the installation of a Westinghouse polyphase graphic wattmeter and a reactive volt-ampere meter, with the necessary additional equipment for same, was authorized in April, and the meters installed and placed in service in September, 1920.

In June, 1920, the low-tension arresters were placed higher up on the wall so as to reduce the danger of the operator coming into accidental contact with them.

Toronto Milling Company, Streetsville

On account of the importance of the load at this plant a recording reactive volt-ampere meter is being installed on the incoming 4,000-volt line. This work will be completed early in 1921.

Streetsville Distributing Station

As it was decided to measure the power supplied at various customers' plants, the installation of the recording reactive volt-ampere meter mentioned in the last report was not made.

One 3-kilowatt service transformer for lighting this station was installed. On account of the increased load in the station the 10/5-ampere current transformers in the incoming feeder were replaced by 20/5-ampere current transformers on August 15, 1920.

Port Credit Brick Company

Metering Equipment

The curve-drawing wattmeter on the incoming line to this station was removed to Stores, and a Westinghouse graphic wattmeter was installed, being put into service in December, 1919.

Milton Municipal Station

The installation of the recording reactive volt-ampere meter and the changes in the current transformers in this station were completed, and the equipment put into service on February 12, 1920.

Woodbridge Distributing Station

The installation of recording reactive volt-ampere meters on the Woodbridge and Bolton feeders in this station, as mentioned in the last report, were completed and the equipment put into operation in April.

KENT TRANSFORMER STATION

The removal of the temporary bank of three 750-kv-a. transformers and installation of the permanent bank of three 1,250-kv-a. units, as mentioned in the last report, were completed in April, 1920.

The installation of the differential relay protection on both transformer banks and of the totalizing metering equipment, as referred to in the last report, was completed in August, 1920. The increasing of the capacity of the Canadian Westinghouse Company's type "E" 26,400-volt oil-circuit breakers has not yet been completed owing to delay in delivery of material.

On account of increase of load, instructions have been given to the Operating Department to re-wind the Canadian Westinghouse Company's 26,400-volt, type "OA" 80-40/5-5-ampere current transformers for a ratio of 160-80/5-5 amperes, and to install a third Canadian Westinghouse Company 160-80/5-ampere transformer on the middle phase. This work will be completed about February, 1921.

Blenheim Distributing Station

The recording reactive volt-ampere meter mentioned in the last report was put into service on May 13th.

Bothwell Distributing Station

On account of the importance of the load at this station, a Canadian Westinghouse recording reactive volt-ampere meter was purchased and installed, being put into service on June 24, 1920.

In order to supply power to the Municipalities of Glencoe, Newbury, and Wardsville, one 4,000-volt feeder switching equipment was purchased from the Canadian Westinghouse Company and installed by the Commission's Construction Department. This equipment was put into service on August 13, 1920.

Chatham Municipal Station

The two high-tension feeders to this station which were operated temporarily at 13,200-volt from October 12, 1919, being fed from the temporary 13,200-volt bank of transformers at Kent Transformer Station, were changed back to 26,400-volt in April, 1920, when the permanent bank was put into regular operation.

Dresden Distributing Station

The additional metering equipment mentioned in the last Annual Report was completed and put into service on May 21.

Four Canadian Westinghouse Company's type "KA" 60/30/5-ampere current transformers on the feeders from this station were replaced in August, 1920, by transformers of the same type, rated 50/5 amperes. The original transformers were sent to the Commission's Storehouse at Toronto.

Forest Distributing Station

The additional metering equipment for this station, as mentioned in the last report, was put into service on June 21.

Petrolia Distributing Station

In order to obtain better relay protection, the relays on the incoming line and on the Wyoming and Petrolia feeders were replaced in September, 1920, by single-pole Canadian General Electric type "PQ" relays.

Ridgetown Distributing Station

The recording reactive volt-ampere meter, mentioned in the last report, was put into service on May 13.

The Canadian Westinghouse Company's type "KA" 20/10/5-ampere current transformers on outgoing feeders in this station were replaced by current transformers of the same type, rated 50/5 amperes. The original transformers were sent to the Commission's warehouse at Toronto.

Sarnia Municipal Station

After examining the tenders on the 1,500-kv-a. transformer referred to in the last report, the Commission recommended to the Sarnia Hydro-Electric System that the transformer be purchased from Moloney Electric Company of Canada, and on November 14, 1919, the order was placed per this recommendation. The switching equipment required was ordered from the Canadian General Electric Company. The transformer will probably be shipped in November. The switching equipment has already been delivered.

Estimates of the cost of the 4,000-volt emergency bus, also referred to in last report were given to the Sarnia Hydro-Electric System, who requested the Commission in January to proceed with the drawings of this bus and to purchase the material required. The greater part of the material was later ordered from the Canadian General Electric Company.

In May the Sarnia Hydro-Electric System decided to improve the appearance of the pole structure outside the station and to provide better operating conditions by taking the power feeders and commercial lighting feeders out of the station underground.

All of this work is now under way, and it is expected that it will be completed in December or January next. The work in the station is being done by the Construction Department of the Commission, and the work outside the station by the Sarnia Hydro-Electric System.

ESSEX TRANSFORMER STATION

The installation of the screens and barriers for protecting the operator against contact with the 26,400-volt wiring were completed on March 24, 1920.

In order to obtain a record of the total power at this station, a totalizing metering equipment, consisting of one graphic wattmeter, one graphic reactive volt-ampere meter, and one watt-hour meter, was purchased from the Canadian Westinghouse Company, installed by the Commission's Operating Department, and put into service on December 3, 1919.

The four-type "OA" 26,000-volt current transformers on the Windsor feeders (No. 1553 and No. 1554) are being re-wound for 80/40-5/5 amperes by the Operating Department, and a third current transformer, rated at 80/40/5 amperes, has been purchased from the Canadian Westinghouse Company for use in the middle phase. It is expected that this equipment will be put into service in January, 1921.

Windsor—Sandwich, Windsor and Amherstburg Railway

Rotary Converter Equipment

In order to increase the power supply to the Sandwich, Windsor and Amherstburg Railway (Essex Division, Hydro-Electric Railways) it was decided in July,

1920, to install a 500-k.w. rotary converter at the Railway Steam Plant in Windsor. This converter is to be supplied with power at 25 cycles from the Windsor Municipal Station. One of the Municipal 4,000-volt feeders is being extended for this purpose.

In August, 1920, a 500-kilowatt General Electric rotary converter, with direct-current panel and equipment, was purchased from McGovern and Company, Montreal. It will be delivered at Windsor early in November. One 570-kv-a. three-phase transformer, stepping down from 4,000-volt delta to six-phase rotary voltage, was purchased from the Packard Electric Company in August. This transformer will be delivered in November. The incoming line-switching equipment was purchased from the Canadian Westinghouse Company.

This equipment will be installed by the Commission's Construction Department in a galvanized iron building about 18 feet by 30 feet, built on to the southwest corner of the present steam plant. The 600-volt D.C. leads from the rotary are to be taken into the present station and connected to the present D.C. buses.

It is expected that this equipment will go into service early in December of this year.

Windsor Municipal Station

In order that the Windsor Hydro-Electric System will be in a position to take care of future load when power from the Queenston-Chippewa Development is available, they requested the Commission on October 28, 1919, to prepare designs for extension to the present station to accommodate four incoming 26,400-volt lines, five 1,500-kv-a. three-phase transformers, and sixteen 4,000-volt outgoing feeders. Three alternative designs, somewhat on the lines of the Etobicoke Distributing Station, were prepared and submitted to the Windsor Hydro System in April, 1920.

Leamington Distributing Station

The maximum demand watt-hour meter referred to in last report was installed temporarily on October 15. It is the intention to provide better and more complete low-tension switching and metering equipment in this station. This work will be commenced as soon as the drawings are completed.

Canard River Distributing Station

The two 10-kv-a., 60-cycle transformers removed from this station in 1919, were transferred to Priceville Distributing Station, on the Eugenia System, in September.

Amherstburg Distributing Station

The three 100-kv-a., 60-cycle transformers which were stored in Amherstburg Station, will be transferred to Orangeville Distributing Station, on the Eugenia System in November.

Essex Distributing Station

The three 50-kv-a., 60-cycle transformers which were stored at Essex were transferred to Teeswater Distributing Station, on the Eugenia System, in September.

Amherstburg

A Westinghouse recording wattmeter was installed in the Distributing Station of the Brunner-Mond Canada, Limited, by the Operating Department of the Commission, the installation being completed on May 20.

YORK TRANSFORMER STATION

The permanent pump-house mentioned in last report was completed, and two Canadian Blower and Forge Company's pumps driven by Canadian Westinghouse 20 horse-power, 3-phase, 550-volt induction motors, were installed and placed in service in February.

In August a Westinghouse graphic voltmeter was installed to read the low-tension bus voltage.

Arrangements are being made to install a General Electric graphic wattmeter on the service load early in the new year.

EUGENIA SYSTEM

EUGENIA FALLS GENERATING STATION

All equipment in the Eugenia Falls Generating Station, mentioned in our last report as being installed at the end of that period, was completed in January, 1920. Tests were made on the new 2,820-kv-a. 4,000-volt Canadian Westinghouse generator during February prior to placing this unit in permanent service. The Westinghouse voltage regulator was adjusted by the manufacturer and placed in service on the system, along with the new unit, on February 29, 1920.

Figure 1 shows a view of the exterior of the Eugenia Falls Generating Station, with penstock and surge tank, and Figure 2, the interior of the Generating Station.

Durham Cement Company Distributing Station

Instructions were received in August, 1920, for the dismantling of all electric equipment owned by the Hydro-Electric Power Commission in the Durham Cement Company's Distributing Station and the storing of this equipment in this building pending disposition. This work was handled by the Construction Department of the Commission, and was completed in October.

Mount Forest Distributing Station

As it has been found that the 22,000-volt multigap arrester in this station did not afford adequate protection for the lightning conditions experienced, instructions were received in December, 1919, to replace this with an arrester which would stand more severe service. An "Oxide Film" arrester was purchased from the Canadian General Electric Company in January and installed by the Commission's Construction Department in May, 1920.

The installation of the recording reactive volt-ampere meter, noted in our last report, was completed by the Operating Department of the Commission and placed in service January 23, 1920.

In order to improve the protection on the feeder from this station, the original relays were placed in August with type "PQ" relays supplied by the Canadian General Electric Company.

Priceville Distributing Station

Instructions were received in June, 1920, for the construction of a pole-type station at Priceville with one 2,200-volt feeder. This station is to be fed from the two 2,200-volt lines from Eugenia Falls Generating Station. Plans were prepared and forwarded to the Construction Department of the Commission in September, 1920.

This station will be connected to the 22,000-volt lines through H.E.P.C. air-break switches. Delta-Star choke coils and fuses have been purchased and protection to equipment will be given by Delta-Star arresters. The transformer equipment will consist of two 10-kv-a. single-phase, 60-cycle, 22,000/2,200-volt General Electric Company transformers which have been transferred from Canard River, Essex County System, where they have been held pending disposition. Outdoor-type current and potential transformers and a Lincoln demand meter are being installed for metering purposes.

It is expected that this station will be ready in December, 1920.

Orangeville

Instructions were received in October, 1920, to replace the three 150-kv-a. 60-cycle Moloney electric power transformers in the Orangeville Distributing Station with three 100-kv-a. 60-cycle General Electric transformers from Amherstburg Distributing Station, Essex County System. Instructions have been issued covering this change. The Moloney transformers will be shipped to Walkerton for service in the Walkerton H.E.P.C. Stone Quarry Distributing Station.

The installation of the Westinghouse graphic-recording reactive volt-ampere meter in this station, noted in our last report, was completed by the Operating Department of the Commission and placed in service March 19, 1920.

Dundalk Distributing Station

The importance of the load on the Dundalk feeder in this station warranted the purchase and installation of a Westinghouse graphic-recording reactive volt-ampere meter and its necessary equipment on this feeder. This work was authorized in March. The meter was obtained from the Port McNicoll Distributing Station and installed by the Operating Department of the Commission, being placed in service on April 30, 1920.

Chesley Distributing Station

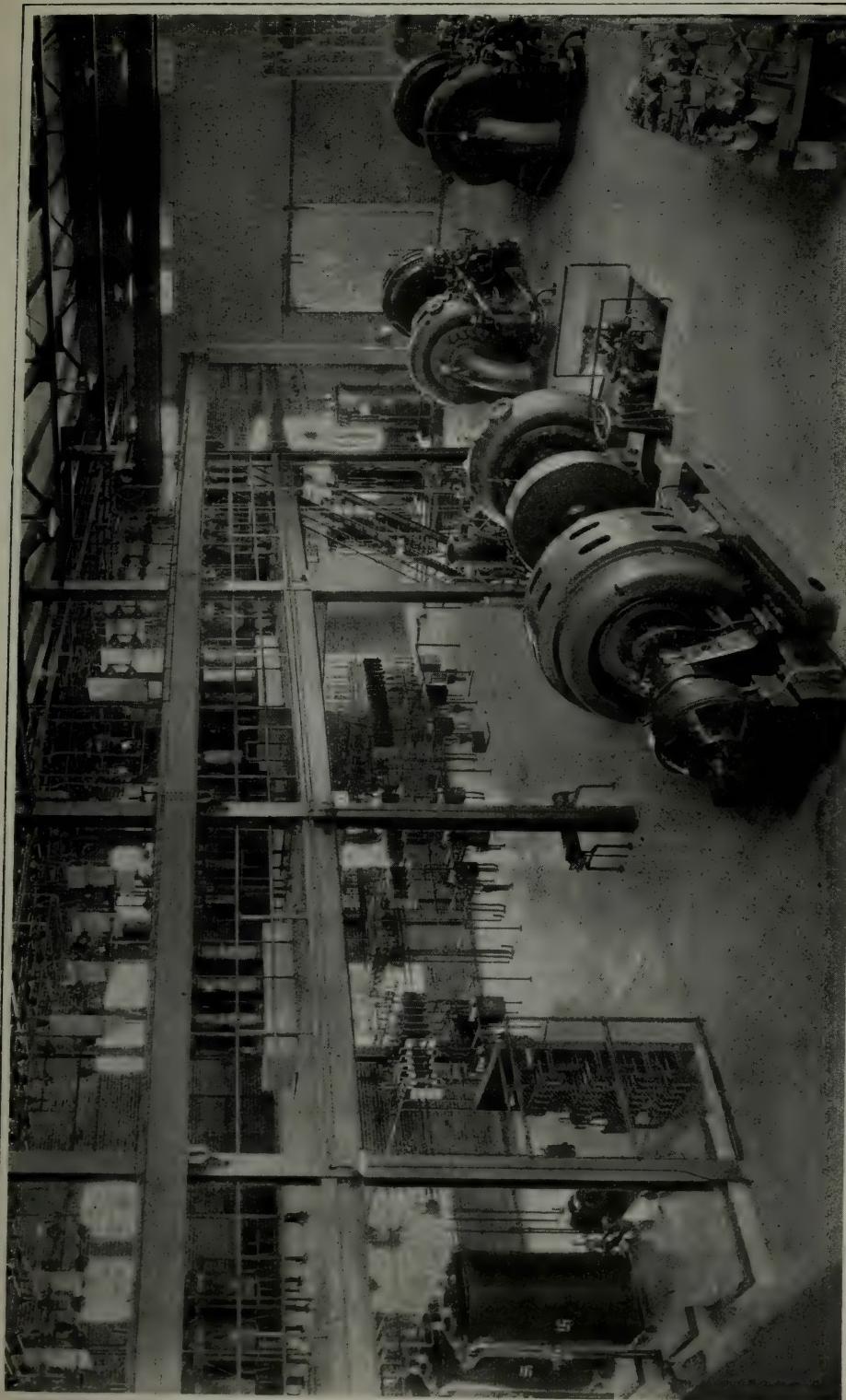
The installation of the recording reactive volt-ampere meter on the Chesley feeder panel in this station, mentioned in our last report, was completed by the Commission's Operating Department, and the meter placed in service January 29, 1920.

Shelburne Distributing Station

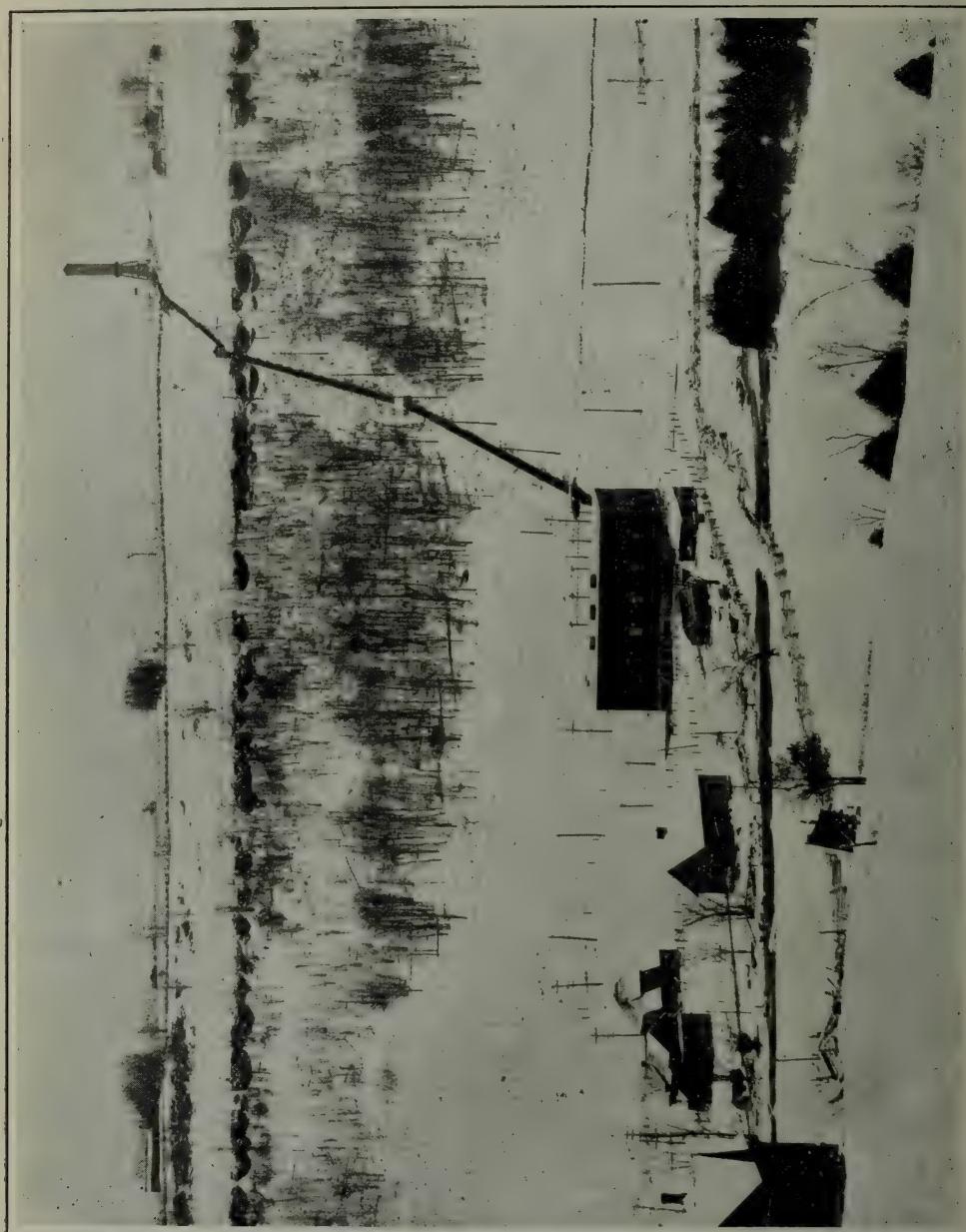
The installation of the recording reactive volt-ampere meter on the Shelburne feeder panel in the Shelburne Distributing Station, mentioned in our last report, was completed by the Commission's Operating Department, and the meter placed in service March 22, 1920.

Hanover Distributing Station

To provide increased transformer capacity at Hanover Distributing Station, it was decided in January, 1920, to replace the bank of three 125-kv-a. transformers feeding the town load, and the bank of three 100-kv-a. transformers feeding the Hanover Cement Company's plant, with two 750-kv-a. three-phase, 60-cycle, 38,000-volt Star, 22,000-volt delta to 4,000-volt Star, 2,300-575-volt delta outdoor type O.I.S.C. transformers.



General interior view, Eugenia Falls Generating Station.



Eugenia Generating Station, Penstock and Surge Tank.

Tenders were called for in March, 1920, and the contract for these transformers was placed with the Packard Electric Company.

It has not been a previous custom to use three-phase outdoor transformers of this capacity on this system. However, to dispense with alterations to the building, it was decided to adopt this course. Both transformers were installed on reinforced concrete platforms outside the building, and disconnecting switches inserted to disconnect them from the bus. Additional feeder equipment was ordered for the 2,300-volt line to the Hanover Cement Company, this equipment being installed inside the station.

The outdoor pole-type station, formerly used to supply the Hanover Portland Cement Company, was dismantled and this equipment shipped to Holyrood.

The three 125-kv-a. transformers used to feed the Hanover town load were shipped to Kincardine for use in the Kincardine Distributing Station now under construction.

These changes were carried out to allow for the future installation of a second 22,000-volt incoming line which will likely be constructed in the spring of 1921.

These changes were made by the Commission's Construction Department, and the change over completed August 29, 1920.

Further instructions were received September 29, 1920, to the effect that the Hanover town load had increased to such an extent that it was necessary to install additional transformer capacity to take care of increased load from the town.

It was decided to purchase one three-phase 750-kv-a. transformer identical with those previously purchased, and tenders were called for September, 20, 1920.

This contract was let to the Packard Electric Company in October, 1920. Drawings are being prepared to cover this new installation. The transformer will be delivered in December, 1920, and put into operation early in 1921.

BRUCE COUNTY SYSTEM

Holyrood Distributing Station

Instructions were received in May, 1920, for the construction of a pole-type distributing station and brick meter-house on a site purchased by the Commission at Holyrood. This station is to feed the municipalities of Ripley and Lucknow at 4,000 volts. Plans and specifications have been prepared, which have been turned over to the Commission's Construction Department, with instructions to carry out the work. The brick meter-house was erected by the Commission in September, 1920.

The station will be fed from a branch 22,000-volt line from the main transmission line now being erected between Hanover and Kincardine.

The pole-structure equipment and transformers have been transferred from Hanover Distributing Station No. 2, the transformers in this connection being a bank of three 100-kv-a. outdoor type 22,000-2,200-volts O.I.S.C. of General Electric manufacture. The switching equipment in the meter-house comprises two 4,000 volt feeders, with the necessary panels, switches, meters and relays. The panels were supplied by the Davis Slate Company, and drilled by the Production and Service Department of the Commission.

The metering equipment consists of General Electric ammeters, a Weston voltmeter and Westinghouse recording wattmeters and recording reactive volt-ampere meters.

The installation of this equipment is now being carried out by the Commission's Construction Department, and it is expected that the station will be placed in service the latter part of 1920.

Kincardine Distributing Station

Instructions were received in June, 1920, for the construction of a 22,000-volt Distributing Station at Kincardine, with one 2,300-volt feeder for service to the municipality.

Instructions at this date covered a type "H" brick station. However, in August, the municipality requested that a space of 33 feet by 31 feet in old power-station be used to house the Commission's apparatus. Plans and specifications were prepared by the Commission for the remodelling of this building, and forwarded in September to the municipality, who are now taking care of this work.

This station will be fed by one 22,000-volt line from Eugenia through H.E.P.C. standard 40,000-volt air-break switch, choke coils and fuse holders, and protection to equipment will be given by Delta-Star lightning arresters. The transformer equipment will consist of a bank of three 125-kv-a., single-phase, 60-cycle, 22,000-2,300/575-volt Canadian Westinghouse transformers, which are being transferred from Hanover Distributing Station. Provision is also being made for the connecting of a 150-kv-a. synchronous condenser to the line at this point, and engineering assistance is being given to the municipality in the arrangement of apparatus and the purchase of additional equipment. The installation in a new location of the 15-k.w. constant current transformer and Anderson type "L" time switch equipment owned by the municipality is also being made by the Commission.

The switching equipment will consist of one outgoing 2,300-volt feeder equipped with a Westinghouse oil circuit breaker current and potential transformers, Canadian General Electric relays, and Garton Daniel arrester. Metering equipment comprises Canadian General Electric ammeters, Weston voltmeter and Westinghouse graphic wattmeter and recording reactive volt-ampere meter.

This station will be ready for service in December, 1920.

Wingham Distributing Station

Instructions were received in June, 1920, covering the construction of a type "G" 22,000-volt brick distributing station at Wingham on a site adjacent to the present Wingham power house. Plans and specifications were prepared and have been forwarded to the Construction Department of the Commission, who will carry out this work. The building was completed in September, 1920.

This station will be fed by one 22,000-volt incoming line through H.E.P.C. air break switch, choke coils, Canadian General Electric 22,000-volt oil circuit breaker, and the equipment is protected by Delta-Star arresters. The transformer equipment will consist of one bank of three 250-kv-a. single phase, 60-cycle, 22,000-2,300/575 O.I.S.C. Canadian General Electric Company's transformers, which have been transferred from the Durham Cement Company's Distributing Station. The low tension switching equipment will consist of two 2,300-volt feeders to the municipality equipped with Garton-Daniel arresters. The metering equipment consists of General Electric ammeters, Weston voltmeter, Westinghouse graphic wattmeter and recording reactive volt-ampere meter.

The construction work is now progressing favourably and the station will be ready for service in December, 1920.

Engineering assistance is also being given in connection with the installation of the constant current transformer, Anderson time-switch and synchronizing connections for the operation of the Wingham Municipal Generating Station in parallel with the Eugenia System on the 2,300-volt bus.

Teeswater Distributing Station

Instructions were received in May, 1920, for the construction of a type "H" brick distributing station at Teeswater. Plans and specifications were prepared and are now in the hands of the Commission's Construction Department. The building was erected by the Commission in September, 1920.

This station will be fed by one 22,000-volt branch line from the main trunk line recently erected from Hanover to Kincardine. H.E.P.C. standard air break switch fuses and choke coils are being installed in this station and protection to equipment is being given by Delta-Star outdoor type lightning arresters.

The transformers to be used are a bank of three 50-kv-a. single phase, 60-cycle, 22,000-2,200-volt outdoor type of General Electric manufacture. These transformers are being transferred from Essex Transformer Station, Essex County System, where they have been held in storage.

The switching equipment will comprise one 4,000-volt feeder equipment. The panel used in this connection was purchased from the Davis Slate Company. A Westinghouse oil circuit breaker, graphic wattmeter and graphic recording reactive volt-ampere meter are being used.

Canadian General Electric relays, ammeters and a Weston voltmeter are also used for this service.

Prints of all drawings were forwarded to the Construction Department, September 25, 1920, and construction work on this station commenced October 11, 1920.

It is expected that this station will be ready for service the latter part of November, 1920.

Engineering assistance is also being given in connection with the installation of a constant current transformer and Anderson time switch, this equipment being the property of the municipality.

Walkerton H.E.P.C. Stone Quarry Distributing Station

Instructions were received in October for the construction of a distributing station near Walkerton to feed 500 horse power to the Commission's stone quarry at 2,200 volts. Three 150-kv-a. single phase transformers are being obtained from the Orangerville Distributing Station. Drawings have been prepared covering this work and will be forwarded to the Commission's Construction Department early in November. The transformers and switchboard will be housed in a wooden building 22 feet by 10 feet. H.E.P.C. choke coils, fuse holders, and Delta-Star arresters will be used for the protection of this station equipment on the incoming 22,000-volt line. The 2,200-volt feeder equipment will comprise one Condit oil circuit breaker, three Ferranti ammeters, Canadian Westinghouse type "B" relays, Canadian General Electric current and potential transformers and Westinghouse graphic wattmeter and recording reactive volt-ampere meter. The switchboard is being obtained from Toronto storehouse.

It is expected that the station will be put into operation in December, 1920.

SEVERN SYSTEM

BIG CHUTE GENERATING STATION

The work of changing the switching equipment referred to in the last Report was completed in July. The three horse-power motor for operating the head gates was installed in July.

The storage battery previously used in the Eugenia Falls Generating Station has been shipped to Big Chute. It is the intention to have this battery put in good condition and installed in Big Chute Station to operate the oil circuit breakers.

Port McNicoll Distributing Station

On account of the small load on this station, the Canadian Westinghouse graphic wattmeter was taken from the metering equipment and sent to the Dundalk Distributing Station. It was replaced by a General Electric curve drawing wattmeter which had been removed from Barrie Distributing Station.

Waubaushene Distributing Station

A graphic frequency meter was installed in the Waubaushene Station to provide a record of the frequency on Eugenia and Severn Systems. This meter was first placed in service on November 20, 1919.

Collingwood Distributing Station No. 1

Owing to the fact that the 22,000-volt Siemen's resistance arrester was not giving adequate protection on the Eugenia Tie Line at the Collingwood Distributing Station end it was decided to replace this arrester by a type more suitable for the severe lightning disturbances in this district.

A Delta-Star 22,000-volt arrester was purchased for this installation in August, 1920, and the shipment made to Collingwood in October, 1920. Instructions have been issued to the Operating Department to install this arrester on the parapet roof, immediately above the incoming Eugenia Tie Line. The Siemen's arrester will be left intact, disconnected from the system and will be used for emergency service only. The installation of the new arrester will be made in November, 1920.

Alliston Distributing Station

Load conditions in the Municipality of Alliston in January necessitated the increased transformer capacity in the Alliston Distributing Station.

Instructions were received in January, 1920, authorizing the purchase and installation of three 75-kv-a. single phase, 60-cycle transformers to replace the three 40-kv-a. transformers then in service.

Tenders for transformers were called for in January, 1920, and the contract placed with the Packard Electric Company. The new transformers arrived at Alliston in March, 1920, and were installed and placed in service March 7, 1920.

The three 40-kv-a. transformers were shipped to the H.E.P.C. storehouse, Toronto, for repairs and overhauling and are being held at Toronto pending disposition. The change over was made by the Commission's Construction Department.

The installation of the recording reactive volt-ampere meter in the Alliston feeder noted in our last Report was completed by the Operating Department of the Commission and placed in service March 16, 1920.

Barrie Distributing Station

The changes in the metering equipment in this station, as noted in our last Report, was completed by the Operating Department and the meters placed in service March 13, 1920.

One of the original General Electric meters was shipped to Port McNicoll where it was installed in the Port McNicoll Distributing Station. The other meter was shipped to Toronto storehouse.

Thornton Distributing Station

Severe lightning disturbance on the section of line in the neighbourhood of Thornton necessitated more adequate protection of the equipment in the Thornton Distributing Station. The purchase of a 22,000-volt Delta-Star lightning arrester was authorized as noted in our last Report, and its installation was completed March 22, 1920.

Elmvale Distributing Station

Installation of the additional metering equipment mentioned in our last Report was completed and the equipment placed in service March 7, 1920.

Stayner Distributing Station

The reactive volt-ampere meter mentioned in the last Report was installed by the Commission's Operating Department and placed in service on March 1, 1920.

WASDELL'S SYSTEM

Kirkfield Distributing Station

Instructions were received in December, 1919, for the construction of a type "H" Distributing Station on a site provided by the Kirkfield Crushed Stone Company near Kirkfield, to supply power to the Crushed Stone Company at 575-volt, and also to the Municipality of Kirkfield at 4,000 volts. The contract for the erection of a cement building to house the Commission's equipment was given to the Kirkfield Crushed Stone Company, who completed the building in March. Tenders were called in January for the supply of three 75-kv-a. single-phase, 60-cycle O.I.S.C. 22,000/2,300-575-volt power transformers. This order was placed with the Packard Electric Company, January 10, 1920, the shipment to Kirkfield being made in March.

This station is fed by one 22,000-volt line from the Wasdell's Falls Generating Station through H.E.P.C. standard air-break switch, and fuses and Canadian Westinghouse choke coils. The equipment is protected by Delta-Star outdoor type lightning arresters. Switching equipment was provided for two outgoing feeders, the Kirkfield town feeder having three 10-kv-a. step-up transformers for feeding

4,000-volt power to the town. All switchboard equipment was purchased from the Canadian Westinghouse Company with the exception of the municipality feeder panel which was purchased from the Davis Slate Company, and the low voltage lightning arresters which are of Garton-Daniels manufacture.

The installation of all equipment was made by the Commission's Construction Department, and the station placed in service April 22, 1920.

RIDEAU SYSTEM

HIGH FALLS GENERATING STATION

Generating Station Equipment

The construction of the Generating Station at High Falls, which was described in last year's Report was sufficiently advanced by May 1st that power could be supplied from it to the Rideau System. The 875-kv-a. generator supplied power through a 750-kv-a., three-phase transformer installed temporarily beside the temporary substation. On July 15th all the generating units and transformer banks with the permanent switching equipment except the voltage regulator, were placed in regular operation.

Local Services

A permanent 550-volt line has been erected to carry power and lighting to the gate house and cottage. Lighting has been provided in the gate house, along the dam and sluiceways and along the roadway to the cottage.

A septic tank has been installed and connected to the cottage.

A small pump-house was erected on the river shore just above high tail water level and a "Wesco" domestic pumping outfit was installed in it to supply water to the operator's cottage. The water intake for this was taken from a cribbing built in the river about two hundred feet from the shore.

Illustrations

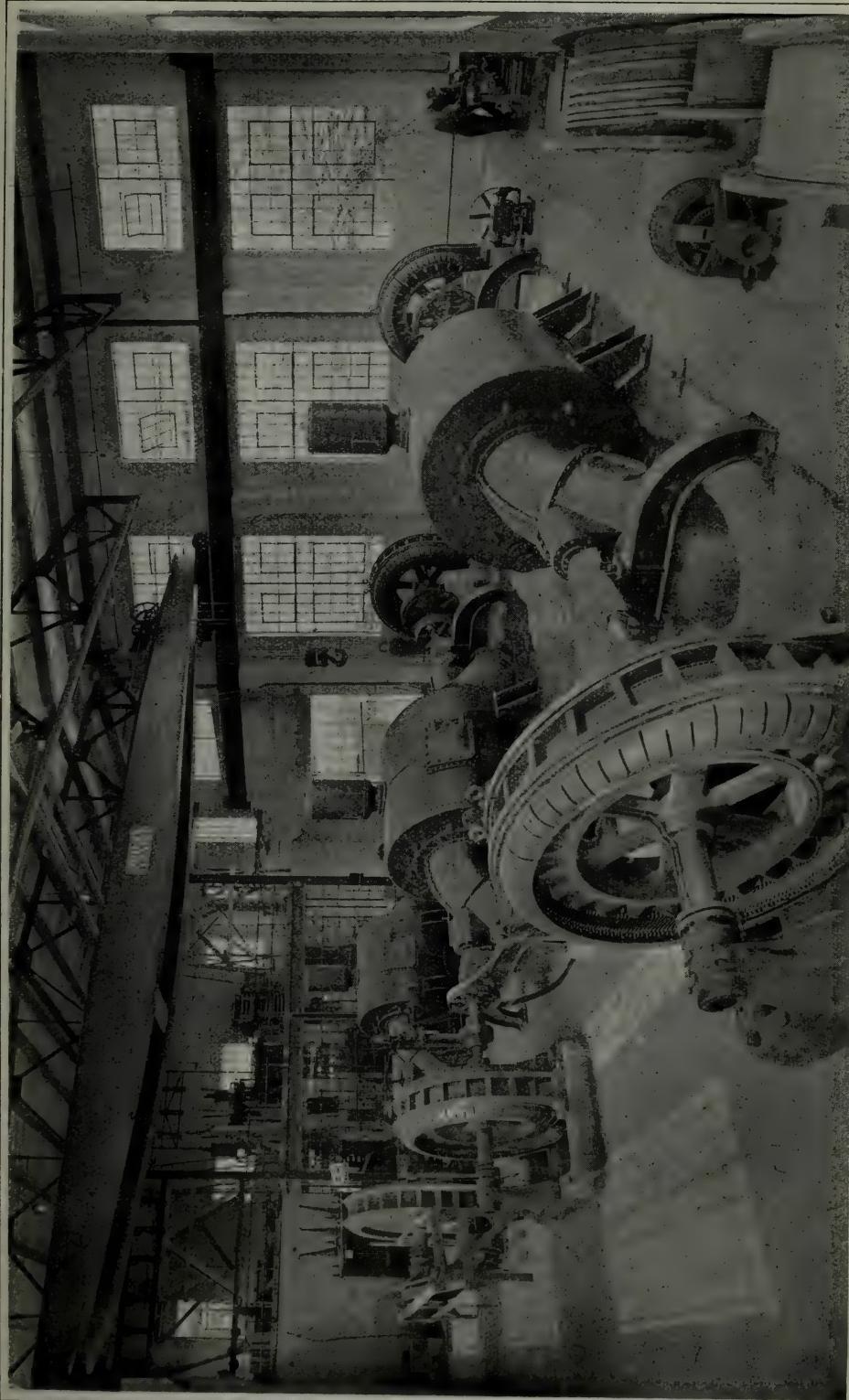
Accompanying illustrations show the exterior and surroundings of the power house, also an interior view of same.

Carleton Place Distributing Station

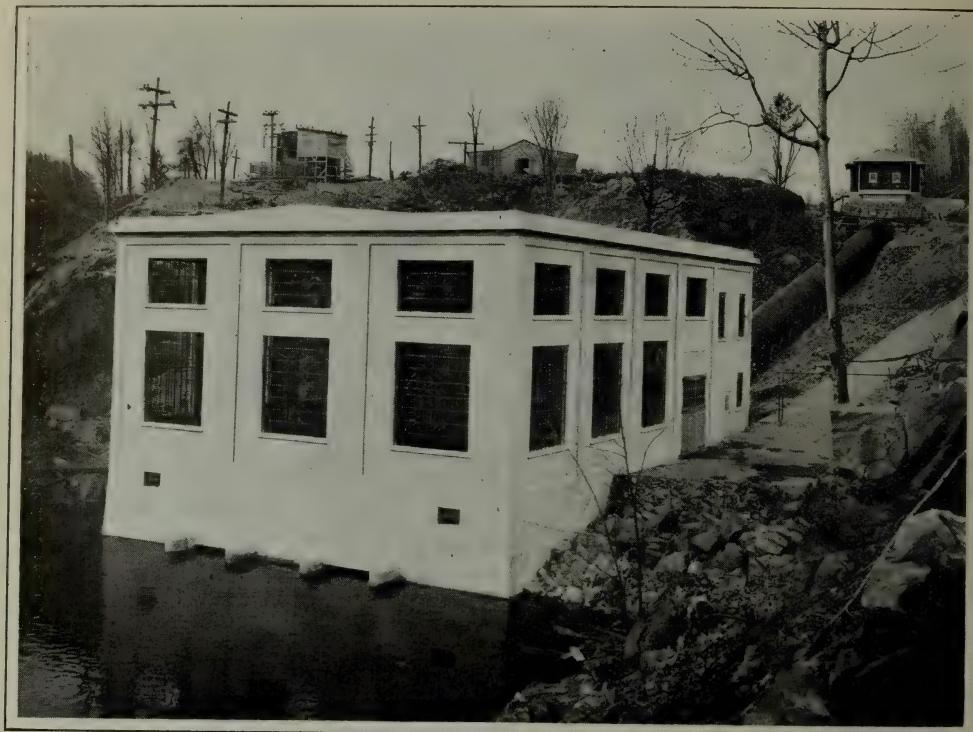
The switching equipment, "K21" Canadian General Electric oil circuit breaker, the three 250-kv-a. Pittsburg transformers and the Siemen's lightning arrester originally installed at Iroquois Transformer Station were removed to and installed in Carleton Place Distributing Station as intimated in the last Report. This station was placed in service with temporary low tension switching on May 31, 1920. The "K21" breaker was provided with an electrical shunt trip. The permanent low tension switching consisting of a three-panel switchboard, was completed in October and placed in service. This equipment is located in the generator room.

Municipal Switchboard

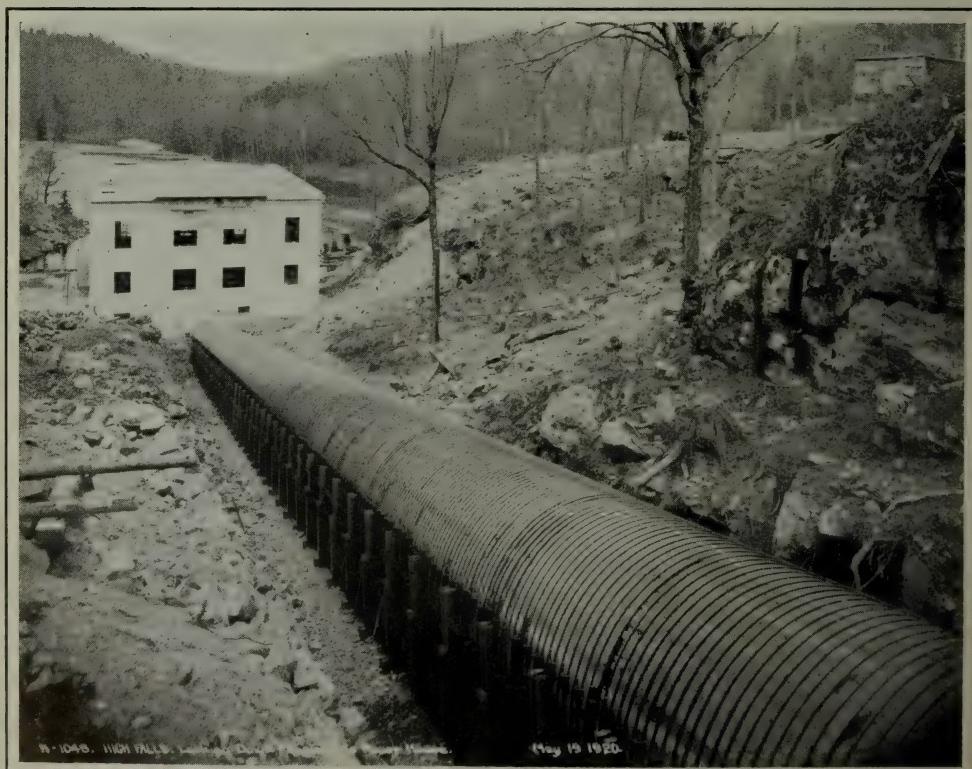
A two-panel, four-feeder switchboard has been installed beside the Commission's panels. This was completed and placed in service on October 24, 1920.



High Falls—General view of Generating Station, showing Control Room and Gallery.



High Falls—General view of Generating Station, Penstock and Gate House.



High Falls—Looking down Penstock to Power House.

Smith Falls Distributing Station

Owing to increase in the load at this station, it was necessary to install a water system for cooling the 750-kv-a. transformer. A "Twinvolute" single stage centrifugal pump driven by a Wagner single-phase motor was purchased from Canadian Fairbanks-Morse Company and installed by the Commission's Construction Department, being put into service in October, 1920.

ST. LAWRENCE SYSTEM

CORNWALL TRANSFORMER STATION

Due to expected increase of load in and near Cornwall, the transformer capacity at this station will have to be increased in the near future. This will probably necessitate the extension of the building and rearrangement of the switching equipment and the installation of a second bank of transformers.

Estimates covering these changes are being made up in October, 1920.

Brockville Distributing Station

Changes in metering equipment as outlined in the last Report were completed and the new equipment put in service.

Provision was also made for synchronizing the 750-kv-a. transformers with the Brockville steam plant at the Commission's 2,300-volt bus.

Alexandria Distributing Station

In order to furnish power to the Town of Alexandria, a standard H.E.P.C. pole type station with a 300-kv-a., three-phase transformer and brick meter house is being constructed. The station is located on a lot which is the property of the town. It will be supplied with power over the 26,400-volt line from Cornwall Transformer Station. The station is designed for 44,000 volts, but will be operated at present at 26,400 volts.

The high tension switching equipment consists of line type air-break disconnecting switches with fuses purchased from the Monarch Electric Company. The transformer was supplied by the Packard Electric Company. The 4,160-volt feeder equipment was transferred from Morrisburg Station where it had been used on the Williamsburg feeder. The station will be ready for service about January 1, 1921.

Chesterville Distributing Station

A fence was installed around the lot containing this station.

IROQUOIS TRANSFORMER STATION

This station has been completely dismantled and the greater part of the equipment has been sent to Carleton Place and the balance to Toronto storehouse. The station building is being retained.

Morrisburg Distributing Station

Owing to advice from the Town of Morrisburg, that they are unable to continue the supply of power to Williamsburg, this station will be discontinued and dismantled. The panel and equipment formerly used to control the power supplied to Williamsburg is to be sent to Alexandria and installed there.

Prescott Distributing Station

The changes to the metering equipment outlined in 1919 Report were completed in February, 1920.

Toronto Paper Company Distributing Station, Cornwall

The permanent switchboard mentioned in the last Report was installed and the permanent feeder connections completed during January, 1920. Owing to a further demand for power by the Toronto Paper Company, a 1,500-kv-a., three-phase transformer has been purchased from the Canadian General Electric Company. It is expected that a second unit of the same size will be required very shortly. The building will be extended during the year to provide spacing for further transformers and switching equipment. Plans and estimates are now being made up to replace the present switching to take care of the increased capacity and additional feeders are for the Paper Company.

Owing to this sudden demand by the Toronto Paper Company for power and to the impossibility of obtaining quick delivery on the 1,500-kv-a. transformer, a 750-kv-a. transformer which has been held at Sulphide as a spare on the Central Ontario System is being installed temporarily. This will be ready for service by the first of the year.

Williamsburg Distributing Station

Owing to the Commission being unable to obtain a further supply of power from the Morrisburg Municipal Generating Station for this town, a new station was required. This is a pole type station with all the equipment placed outdoors and is to be located at the edge of the town on a lot owned by the municipality.

Delta-Star air-break switches and fuses are used on the high tension side to connect to the 26,400-volt line from Cornwall. A 50-kv-a., single-phase transformer was supplied by the Moloney Electric Company. The station is designed for 44,000 volts, the transformer being provided with a special 26,400 tap for use at the present time. Provision has been made whereby two additional similar transformers can be installed. A Lincoln demand meter is used to measure the load.

This station is expected to be in service before the end of the year at which time the supply from Morrisburg will be discontinued.

CENTRAL ONTARIO SYSTEM

AUBURN GENERATING STATION

In order to supply power to Lakefield, it was decided to run a 6,600-volt feeder, connecting it to the switch which formerly controlled the feeder to the Auburn Woollen Mills. This necessitated certain changes in the metering equipment for the woollen mills.

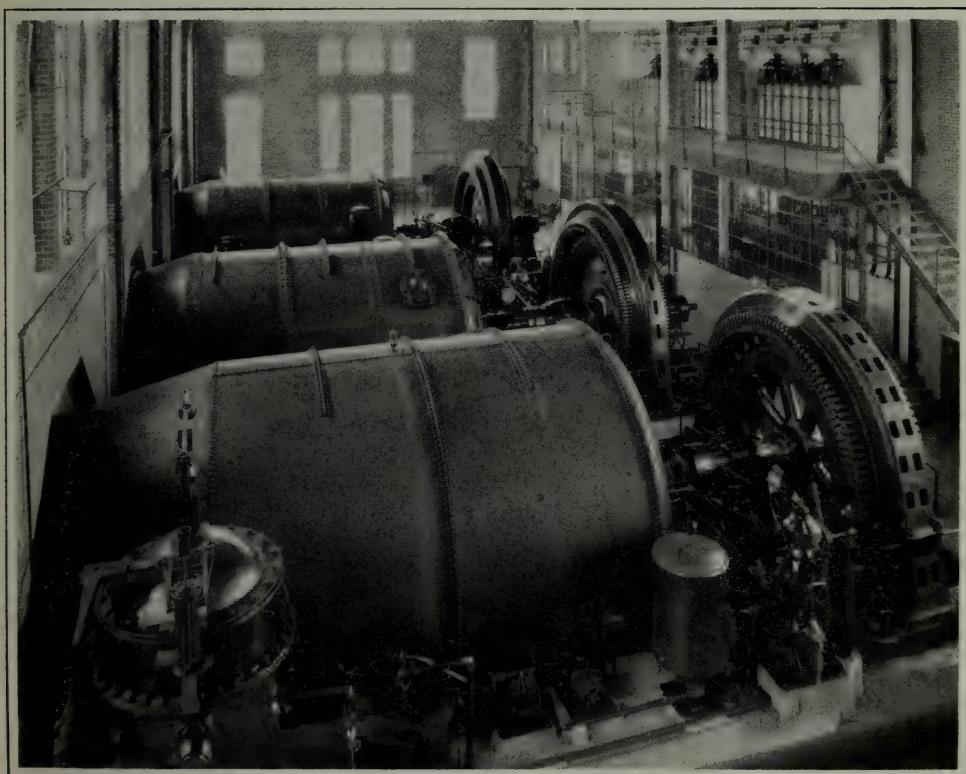
AUBURN TRANSFORMER STATION

The installation of the outdoor switching equipment for controlling the Auburn end of the Auburn-Healey Falls tie line, as mentioned in the last Report, was completed and put into service in May, 1920.

The "K10" 44,000-volt oil circuit breaker in the Transformer Station was changed from hand operation to remote electrical operation during the year.

HEALEY FALLS GENERATING STATION

The switching equipment for No. 4 outgoing 44-volt tie line to Auburn, mentioned in the last Report, was completed and placed in service with the tie line in May, 1920.



Healey Falls Generating Station from the south end.

Due to a demand for power from the Ontario Rock Company at Preneveau, a 6,600-volt feeder was installed. This was placed in service in July, 1920, with temporary connections. The permanent switching will be installed about the first of the year 1921.

Authorization has been received to ground the high tension neutral of the step-up transformers and also install relays to improve the protection on the lines and the continuity of the service. This work will be commenced at once. Grounding devices have been installed for each of the three outgoing 44,000-volt lines.

Totalizing metering is being installed for recording the total output of this station.

Views of the three water-wheels and generating units and of the control room and Low Tension switch gallery are shown in the accompanying illustration.

FENELON FALLS GENERATING STATION

Owing to the inadequacy of the lightning protective equipment at this station, provision has been made to install a set of Garton Daniel Arresters on each of the outgoing feeders.

Metering equipment was installed during the year to measure the power supplied to the Commission from the town plant.

RANNEY FALLS GENERATING STATION

Early in the year 1920 it was decided to proceed with the development of the Ranney Falls power site, with a view to having power available in the autumn of 1921. Tenders were requested and an order placed in May with the Canadian General Electric Company, covering two 4,500-kv-a 120 r.p.m. 60-cycle, three-phase, 6,600-volt vertical water-wheel generators with spring type thrust bearings, direct connected 50-k.w. excitors and all accessories including a 50-k.w. motor generator set to be used as a spare source of excitation. These units will be delivered during the summer of 1921. Design of the power-house is well advanced. This will accommodate in addition to the generators, switching equipment and transformers to handle the power from these two units and also for the power which may in the future be developed at the power sites at Dams No. 8 and No. 9.

It is expected that power from the two units will be available before the end of 1921.

SEYMOUR DAM NO. 11 GENERATING STATION—CAMPBELLFORD

Devices for grounding the 44,000-volt lines during repairs were installed in this station during the year.

Necessary changes in the relay protection to accommodate the grounding of the high tension neutral of the system have been authorized and will be started at once.

SIDNEY DAM NO. 2 GENERATING STATION

Arrangements are being made to install a set of brakes on each of two generators at the station to bring the units to rest in case of emergency. These are of an experimental nature, and if they prove satisfactory all the units will be so equipped.

Sidney Terminal Station

Instructions have been received to ground the neutral of the high tension side of the power transformers to improve the protection on the lines and equipment. Necessary changes to the relay equipment to accommodate this change have been authorized, and the entire work will be commenced at an early date.

Belleville Cement Distributing Station

The metering equipment in this station was re-arranged.

Belleville Distributing Station

One 40-kv-a. potential regulator with auxiliary equipment, which had been removed from Cobourg, was installed in this station to give better voltage regulation on the outgoing feeders.

Cobourg Distributing Station

During the year a manhole was installed on the street at the junction of street sewer and the sewer from substation and cottage.

The 40-kv-a. potential regulator with auxiliary equipment in this station was removed during the year and taken to Belleville.

Deloro Distributing Station

The condit relays on the 44,000-volt line oil switch in this station were removed to Healey Falls Generating Station and replaced by Type "B" relays.

Hydro Electric Commission's Pulp Mill Distributing Station

The necessary low-tension switching was installed temporarily for the supply of power for the construction work for the new Ranney Falls Power Development.

Lakefield Distributing Station

This station is supplied with power at 6,600 volts over a feeder from Auburn Generating Station. It is one of the H.E.P.C. standard outdoor stations, with brick meter house, adapted for 6,600 volts. Three 75-kv-a. single-phase 6,600/2,400-Volts Packard Service type transformers are installed. Owing to a fire in the local station early in the year, this station was cut into service temporarily in July. The permanent switching on the low-tension side will be complete about the end of the year.

Madoc Distributing Station

Condit relays on the 44,000-volt switch in this station were removed to Healey Falls Generating Station and replaced with Westinghouse Type "B" overload relays. Due to decrease in the demand for power by the Canadian Sulphur Ore Company it was possible to remove three 50-kv-a. service transformers. These were transferred to the Ranney Falls Development.

Marmora Distributing Station

A pole type station for three 50-kv-a., 44,000-volt single-phase transformers is being erected on the highway close to the river and directly under the 44,000-volt line. Only one transformer will be installed at the present time. The metering equipment will be placed in a meter kiosk.

The transformer is supplied by the Moloney Electric Company and the high-tension switching by the Monarch Electric Company. Provision is made for one low-tension feeder to supply the total power to the town at 2,400 volts, but the voltage will be raised to 4,160 when the three-phase equipment is installed. It is expected that this station will be ready for service before the end of the year.

Norwood Distributing Station

A standard H.E.P.C. pole type station with a 300-kv-a. three-phase transformer and brick meter house will be erected on a lot outside of the town limits along the 44,000-volt tie line between Peterboro and Healey Falls. The station is arranged so that its capacity can readily be doubled. Two low-tension feeders at 4,160 volts are being installed at the present time, one to supply Norwood and the second Havelock.

Space is provided for two additional feeders. The transformer was supplied by the Packard Electric Company and the high-tension switching by the Monarch Electric Company. It is expected that this station will be ready for service early in 1921.

Oshawa Distributing Station

The installation of the 1,500-kv-a. three-phase transformer and necessary switching, noted in the last Report, was completed and placed in service on March, 1920. The capacity of one outgoing feeder was increased, the new equipment being placed in service early in the year.

Owing to further increase in the load at the station a second 1,500-kv-a. transformer was purchased from the Canadian General Electric Company to replace one of the present 750-kv-a. units, and will be installed early in 1921. Two additional outgoing feeder equipment have been purchased from the Canadian Westinghouse Company, and these also will be installed early in 1921.

Port Hope Distributing Station

One graphic wattmeter and one current transformer were removed from this station. Devices for grounding the high-tension lines out of this station while same are under repairs were installed during the year.

Sterling Municipal Station

Arrangements are being made to install a graphic recording wattmeter to measure the power taken by this municipality.

Whitby Distributing Station

The outdoor metering equipment at the edge of the town was dismantled, and a new metering equipment to measure the power supplied to Whitby was installed in the Distributing Station.

NIPISSING SYSTEM

NIPISSING GENERATING STATION

In conjunction with the proposed remodelling of the hydraulic equipment, the necessary changes in the electrical equipment are being made.

In June a 1,400-kv-a. at 75 per cent. power factor maximum rated, 3-phase, 60-cycle, 2,300-volt., 450 r.p.m. horizontal water-wheel type generator was ordered from the Canadian Westinghouse Company. This machine will be delivered during the coming winter.

An order was given in August to the Packard Electric Company, of St. Catharines, Ontario, for three 900-kv-a. single-phase, 60-cycle, oil-insulated, water-cooled

transformers, 2,300 volts to 23,000/24,000/25,000/26,000 volts. These transformers have now been shipped and will be transported from the railroad to the power-house by water across Lake Nipissing and stored there until the generator arrives.

It is the intention to replace one old 450-kv-a. generator and the bank of three old 300-kv-a. transformers with the new apparatus.

Drawings are being prepared for the changes which will be necessary in the foundations in order to carry the new heavier apparatus.

The installation work will be undertaken in the late winter months or early summer.

French River Development

Preliminary designs were made, approximate prices of apparatus were obtained and estimates were prepared on two developments on the French River.

At Chaudiere Falls it is proposed to use four vertical type generating units of 2,800-kv-a. at 85.7 r.p.m., and at Five Mile Rapids three generating units of approximately the same rating.

Sketches and studies were made of station design and layout of equipment.

It is proposed to generate to 6,600 volts, three-phase and step up to 110,000 volts for transmission to Sudbury and other points.

THUNDER BAY SYSTEM

NIPIGON GENERATING STATION

General

In the last Annual Report a description of the complete installation proposed for this station was given and it was also mentioned that the initial installation would consist of two 10,600-kv-a. generating units, one bank of three 8,000-kv-a. transformers with spare and equipment for one 110,000-volt outgoing line.

Switching and Protective Equipment

On December 12, 1919, an order was placed with the Canadian General Electric Company for the 110,000-volt lightning arrester required for this station.

In February tenders were requested on a storage battery, a motor generator set for charging the battery, and the switchboard equipment. The order for the storage battery was awarded to the Canadian Hart Accumulator Company on May 15; the order for the motor generator sent to the Canadian Crocker Wheeler Company on July 8th; the order for Weston Instruments to A. H. Winter Joyner, Limited, on March 15th; and the order for the switchboard to Canadian Westinghouse Company on March 19th.

In April tenders were received on the 12,000-volt disconnecting switches, bus supports and floor and wall bushings. On May 26th the order was placed with the Canadian Westinghouse Company for the disconnecting switches and bus supports, while the floor and wall bushings were ordered from the Electrical Development and Machine Company of Philadelphia, on June 26th.

On June 30th the 12,000-volt current and potential transformers which are required and which were not included in the generator contract were ordered from the Canadian Westinghouse Company.

All of the switching and protective apparatus will be installed by the Construction Department of the Commission.

Mechanical Equipment

The 75-ton and the 10-ton cranes referred to in last Report have been delivered and the 75-ton crane in the generator room was put into operation in October, while the 10-ton crane in the gate-house will probably be erected in December. On July 5th, after tenders had been obtained from several manufacturers the order for the 45-ton transformer truck was given to Northern Crane Works, Walkerville. The filtering equipment for the lubricating oil for the generator bearings was ordered from Richardson Phoenix Company of Milwaukee, Wisconsin, on July 27th. The filter for the transformer oil was ordered from the Canadian Westinghouse Company on May 10th.

In August two 250-gallon water pumps for supplying cooling water for the transformers and for the generator bearings, also two 75-gallon oil pumps for circulating the oil through the generator bearings were ordered from the Turbine Equipment Company, Toronto. Two transformer oil tanks, and one lubricating oil tank were ordered from the Canadian Allis Chalmers Company on August 26th. A three-ton hand operated hoist for lifting the 12,000-volt oil circuit breakers was ordered from Herbert Morris Crane & Hoist Company on October 7th.

Transformers

For the station service three 250-kv-a. 13,200-volts high-tension, 2,300 and 575-volt single-phase self-cooled transformers were ordered from the Packard Electric Company on March 22nd.

Building

As noted in the last Report the building is to be concrete with steel framework, and is being erected by the Construction Department of the Commission, also the structure steel is being supplied by McGregor & McIntyre, Limited, of Toronto. The steel sash required was ordered from the Trussed Concrete Steel Company on July 16th. The passenger elevator was ordered from Turnbull Elevator Company on August 6th. Steel details such as stairs and ladders were ordered from Toronto Steel Construction Company on September 20th.

Progress of Work

In August it was found that by careful planning, power could be supplied to the City of Port Arthur by December 20, 1920, on which date the present contract for power for this city expired. To do this it will be necessary to have one or both of the generators ready for service, but the transformers and switching equipment must be installed temporarily on the generator floor. In this temporary installation, the drawings for which are nearly completed, two transformers will be used, being connected open delta and supplying power to the high-tension lines at 63,500 volts.

Two tanks for the 8,000-kv-a. transformers were shipped from Canadian General Electric Company's factory at Peterboro on October 26th, and the transformers themselves will go forward in November. It is expected that the remaining two transformers will be shipped during December.

Shipment of the generator parts was commenced in May. The Canadian Westinghouse Company are sending their men to the station in October to begin the erection of the two generators.

The steel for the generator room has been erected.

On account of weather conditions it will not be possible to pour the concrete walls of the generator room, and therefore arrangements have been made to run up the forms for these walls to the full height, and by covering outside with paper and an extra wood sheeting provide housing for the generator and other equipment during the winter months. A temporary wood roof has been placed.

The three 250-kv-a. transformers were shipped by the Packard Electric Company in September and will be temporarily connected up on the generator floor to provide power for cranes and station service.

The low-tension oil circuit breakers referred to in last report have been delivered at Nipigon Station, and the high-tension breakers will be shipped during the month of November.

During November the switching apparatus required for the temporary installation will be shipped to the station, and will be installed as soon as delivered.

POR T ARTHUR (NIPIGON) TRANSFORMER STATION

As the future requirements at this station could not be estimated it was decided in June that a temporary station should be erected near the Port Arthur Pumping Station. The equipment to be installed will be as described in last Report, except that switching apparatus for only two feeders, instead of four, will be installed at present. In October it was arranged to have the two 22,000-volt feeder breakers, arresters and switchboard panels placed in the pumping station.

Drawings of the building were completed early in September, and it is expected that the building will be completed by November 1st. The building is approximately 67 by 40 by 30 feet high, inside dimensions, and is of wood frame construction, the walls being of wood sheeting with "gunite" on the outside.

Electrical layout drawings were completed in October, and it is expected that the station will be ready for operation by December 20th.

As noted in last Report four 4,000-kv-a. transformers were ordered from Canadian General Electric Company. These transformers will be shipped, two in November and two in December. The 110,000-volt oil circuit breaker is a Westinghouse type "GA" which was removed from the Dundas Transformer Station, and which has been rebuilt by the Canadian Westinghouse Company. Three 46,000-volt, type "GA-3" oil circuit breakers for the station service and for the 22,000-volt feeders were ordered from the Canadian Westinghouse Company, being shipped from stock. The 110,000-volt lightning arrester was ordered from the Canadian General Electric Company on December 12, 1919. The 110,000-volt insulators were ordered from Ohio Brass Company, Mansfield, Ohio, in December, 1919. The station service transformer, which will be 75-kv-a., 3-phase, 22,000-volts, high-tension, 2,300 volts and 575 volts low-tension, has been ordered from the Canadian General Electric Company, and will be supplied from stock. The pump to supply cooling water for the transformers was ordered from the Canadian Allis Chalmers in September. The graphic wattmeters and graphic voltmeters are being supplied by the Canadian Westinghouse Company, while the indicating instruments will be "Weston" type, supplied by A. H. Winter-Joyner, Limited.

All work at this station is being carried out by the Commission's Construction Department.

SECTION V

POWER CONSTRUCTION

POWER AND STORAGE

General

The Commission has during the past year prosecuted energetically all work in connection with the various enterprises under consideration. The power shortage covering as it has, the whole Province, made it necessary that the various works be carried on with the utmost energy. The investigations on the St. Lawrence and Trent Rivers have been continued throughout the year and in addition storage surveys have been made on several of the smaller rivers. The Commission has advised, upon request, the various municipalities regarding problems arising from time to time in connection with their administration and work.

POWER CONSTRUCTION

Nipigon Development

Work has progressed rapidly on the installation at Cameron's Falls, every effort having been made to supply the pressing needs of Port Arthur and Fort William, for power, as soon as possible.

The tail race which is about 1,000 feet in length necessitated excavation to the extent of 122,000 cu. yds. of earth and 57,000 cu. yds. of rock. Rip rap has been placed to the extent of 2,100 cu. yds. This work was carried out by means of a cofferdam which cut off the river flow thereby permitting the work to be done in the dry.

The forebay excavation necessitated the removal of about 20,000 cu. yds. of material, including wing walls, mostly rock. Concrete was poured on the wing walls to the amount of 6,000 cu. yds., and about 3,000 cu. yds. of rock fill and puddle was placed in connection with same.

The necessity of completing the whole substructure of the power house for six units entailed considerable work that was not essential in itself for the operation of the first two units. Some 34,000 cu. yds. of rock were removed from the power house site and concrete was poured for the substructure, to the amount of 28,000 cu. yds. In order that the plant might be put in immediate operation the steel for the superstructure of the power house was erected and temporarily sheeted in. This enabled the turbine and generator erection to be rushed to completion and No. 2 Unit was placed in commercial operation on the night of December 20th, 1920, which was the scheduled date for the delivery of power to Port Arthur.

As it was not considered possible to complete the main dam by this date a substantial cofferdam was placed, sheeted and puddled, and the water allowed to flow over the top. While this did not give the total available head it permits of satisfactory operation until the spring when construction will be started on the concrete dam.

The water having been raised some 29 feet above the former level of Lake Jessie made it necessary to clear the land up to the 745 contour on both sides of the river above the plant up as far as Pine Portage. To date some 500 acres of this land have been cleared.

The Nipigon River being known the world over for its fishing necessitated the installation of a good type of fishway which would permit the fish to pass easily up and down the river and enable them to overcome the 72-foot drop at the plant. After much study a satisfactory type was designed.

The present installation consists of two 12,500 horse-power vertical single runner turbines operating under 72-foot head at 120 r.p.m., manufactured by the I. P. Morris Company, of Philadelphia. They are set in reinforced concrete scroll cases and drive 60-cycle generators supplied by the Canadian Westinghouse. It is expected that the Commission will shortly increase the capacity of the installation.

High Falls Development

During the past year the High Falls Development on the Mississippi River was completed and placed in operation. No. 1 Unit was placed on the load on May 1st and Nos. 2 and 3 on June 26th, 1920.

Though the construction force put forth its best efforts on this work the labour situation at all times left much to be desired. It was practically impossible to maintain the force at full strength at any time during the construction period. For a period of two months the job was held up by a strike, a result of demands for higher wages from common labour, at a time when delay meant much loss of time and money. Owing to high costs and delays caused by labour conditions it was almost impossible to obtain the necessary materials and supplies, though these were ordered well in advance of requirements. Construction work was at times greatly held up by failure of power from Merrickville. Time after time, just when the pumps had cleared the power house site of water the supply of power would fail resulting in much work to be repeated. On February 10th, 1920, this supply of power gave out altogether and it was necessary to install steam pumps to do the work. The force was also greatly depleted by an influenza epidemic which visited the camp, making it impossible to secure men. The plant, however, was rushed to completion on scheduled time.

The installation consists of three 1,200 horse-power turbines of horizontal setting, cylindrical casing, double discharge type, operating under 85-foot head at a speed of 300 r.p.m. This plant supplies power to the Rideau System of the Commission.

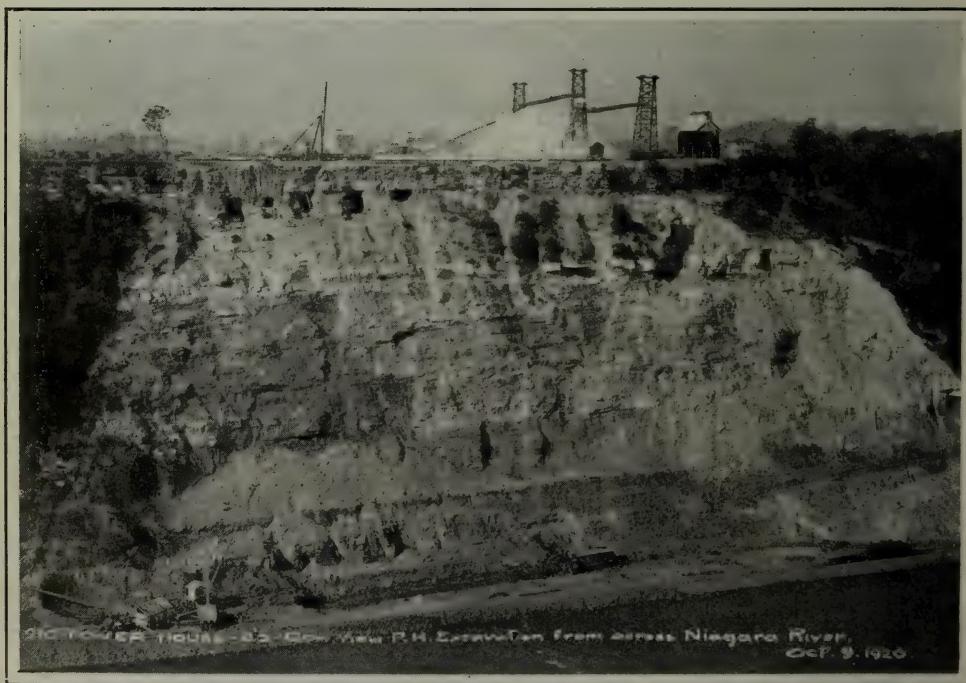
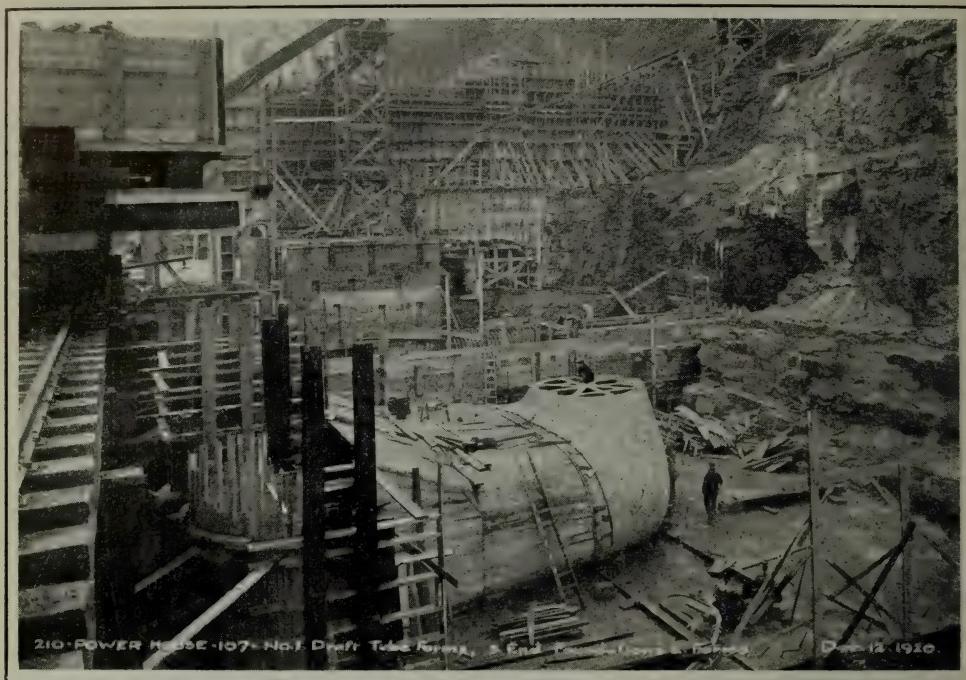
The excavation in connection with the development amounted to about 7,000 cu. yds. of earth and 7,000 cu. yds. of rock. Concrete was placed in dam, gate house and power house substructure to the amount of 5,800 cu. yds.

Ranney's Falls

Due to the increased demand on the Central Ontario System the Commission decided during the year to go ahead with the development at Ranney's Falls at Lock No. 10 of the Trent Valley Canal System.

Water will be drawn from sluiceways provided by the Department of Railways and Canals, in the canal walls directly into the forebay. From here it will be conducted in reinforced concrete penstocks to the turbines which will be set in concrete scroll cases.

The turbines, two in number, are of the single runner vertical type, developing 5,000 horse-power under a head of 47 feet when operating at a speed of 120 r.p.m. The tailrace is some 300 feet in length and discharges directly into the lower river.



To date some 5,300 cu. yds. of rock have been removed from the forebay, 4,700 cu. yds. from the power house site, and 5,500 cu. yds. from the tail race. The construction railway into the plant has been completed and work is proceeding on the permanent roadway.

St. Lawrence River Survey

The investigations for power development on the St. Lawrence River have been carried forward as outlined in last year's report. Field parties have been engaged in locating contours on both sides of the river from the head of the Galops Rapids to the foot of the Long Sault. Artificial features are being tied into the various contours. Metering parties have established sections at various places throughout the vicinity and automatic gauges have been installed.

The field work has been completed and the staff is now engaged in plotting the notes and compiling hydraulic data which has been collected. Advance estimates of development have been made for various layouts for information purposes.

Niagara Development

The office and field staff have energetically pushed all work in connection with the development at Niagara throughout the past year and unless something unforeseen occurs the largest of all Hydro-Electric Developments will be operating before another year has passed.

Work on the intake section is well in hand. The dredge *Boone* has been in continuous operation throughout the year, excavating material for the intake and ship channel. Pile driving by means of derrick and scow has been proceeding with the result that the intake cofferdam is well on the way to completion. A Beatty hoist and derrick scow are clamming material for the intake cofferdam.

Arrangements have been made with the Toronto Harbour Commission to secure the large suction dredge *Cyclone* which will be operated on the river section. The Lidgerwood cableway has been in continuous operation throughout the year and has made good progress toward completion of deepening this portion of the river. During the year good progress was made on the canal excavation, there having been removed from the start of the job to date 6,327,000 cu. yds. of earth and 1,980,000 cu. yds. of rock. As outlined in last year's Report, many bridges, both highway and railroad, have been built and work is progressing satisfactorily on the others. Placing the concrete lining in canal is now in progress. This is being done by means of first concreting two strips of canal floor. Rails are then laid on this and movable towers holding forms for the walls are moved along section by section.

The tunnels for penstocks and ice chute have been driven through the cliff and work is now proceeding on the penstock trenches.

The power house excavation has been completed for the first two main units and ice chute. It is the intention to proceed rapidly with the completion of this part of the work in order that these two units may be ready for delivery of power by the fall of 1921. The installation of the other three units may then be proceeded with. The job as a whole is proceeding according to schedule.

STORAGE

Trent River

As information accumulated from various sources and was analyzed for value, it soon became evident that the general enquiry into the Trent River storage would have to be carried out under the following heads:—

(a) The determination of the greatest minimum mean daily discharge per month at either Peterborough or Healy Falls with the present storage, due allowance being paid to river driving operations and canal levels.

Precipitation, temperature, discharge and lake levels records have been procured for the last ten years and are in process of being worked up to determine this flow. The preliminary step was the determination of the probable natural discharge.

(b) The determination of the greatest minimum mean daily discharge per month with possible increased storage.

This information is being worked up and drawings and estimates made of storage schemes, the cost of same being computed on a basis of "Horse-power Year Per Annum" and with reference to the power sites on the river, both developed and undeveloped.

Considerable time was given this year to the Central Ontario System of the Commission in the study of the economical use of the existing river discharge at the generating stations to the end of gaining the maximum output, and having consideration to the capacities of the generating stations in use and the limitations imposed by the officials of the Department of Railways and Canals.

Storage Dams on South River

The Hydro-Electric Power Commission of Ontario have found it necessary to improve the flow of the South River, on which is situated the Nipissing Power Plant, in order to meet the growing demand from the town of North Bay and surrounding district.

This plant was acquired, when the Commission took over the Electric Power Company, along with the series of plants, owned and controlled by them on the Trent and Severn Rivers.

Though the plant is small in capacity it will probably be of interest to note the manner in which the improvements are being carried out.

Storage

The South River being a small stream, it has been found necessary, in the past, to make use of a steam auxiliary during the summer months and winter months when the flow of the river is low. It has been found necessary, however, because of the scarcity of fuel and the uncertainty of delivery to build storage dams on the upper reaches of the river to conserve the water.

These storage dams are at the outlets of small lakes ranging in surface area from 100 to 1,000 acres. The dams are of timber crib, rock fill construction, sheeted on the face and puddled with a single sluiceway containing stop logs, to permit of regulating the off-flow. (See photographs.) The dams are eight in number, the greatest height being in the neighbourhood of 20 feet. The storage heads range from about 2 feet to 14 feet on one of the lakes and the total storage impounded is in the neighbourhood of 26,000 acre feet. It is expected that with the storage, there will be obtainable 1,500 horse-power continuous with a plant efficiency of 80 per cent., and on this basis 2,200 horse-power with an annual load factor of 70 per cent.

Reconstruction

The turbines in the plant being rather antiquated are very low in efficiency and this is being rectified as set out below.

New runners have been designed for the old casings which will develop 1,400 B.H.P. each in place of 1,000 B.H.P. developed by the old runners. New seal rings will be put in and the connection between the guide vanes and the governor which at present is very light made more substantial. In addition to this, two new butterfly valves will be placed in the power house instead of the old gate valves, and some time in the near future a new wood stave pipe will be installed in place of the old one. New electrical equipment is also being installed, as well as a new shaft.

It is expected that these changes with the increased flow will take care of the demand for some time to come.

Seguin River

The Commission has decided upon request of the Municipality of Parry Sound to make a survey of the storage possibilities on the Seguin River watershed. This will be in the nature of reconnaissance work and will embrace a complete report of improving the flow of the river by the building of storage dams, etc., on the upper lakes.



SECTION VI

MUNICIPAL WORK

NIAGARA SYSTEM

GENERAL

Increase in power demands of municipalities on the Niagara System during the year made it necessary to limit the supply to each municipality, and at times of ice trouble at the generating stations during the early spring further reductions in loads were necessary for short periods. Arrangements are being made for an additional supply of power early in the coming year. Considerable assistance was given to the municipality by the engineers of this Commission in the adjustment of loads on local systems so that the best use could be made of the limited power supply.

The operating conditions of each municipal system during 1919 were analyzed for the purpose of investigating the suitability of rates and to ascertain the actual cost of supplying street lighting and municipal power, so that any surplus could be refunded by the local system to the general fund of the municipality.

General engineering assistance was given in connection with the operation of systems in the following municipalities:

Ayr, Baden, Bolton, Burgessville, Clinton, Dashwood, Delaware, Delora, Drayton, Drumbo, Dutton, Exeter, Galt, Goderich, Granton, Harrison, Hensall, Hespeler, Ingersoll, Lambeth, London, Lynden, Milverton, Mitchell, Moorefield, Mount Brydges, Norwich, Otterville, Paris, Plattsburgh, Port Credit, Port Stanley, Preston, Princeton, Rockwood, Rodney, St. Catharines, St. Jacobs, St. Mary's, Seaforth, Simcoe, Springfield, Strathroy, Stratford, Tavistock, Thamesford, Thorndale, Waterdown, Waterford, Welland, Weston, Woodbridge, Zurich.

SPECIAL

Special engineering assistance was given in the following municipalities:

Acton

Engineering advice was given with regard to the extension of distribution system south of the village to serve municipal waterworks pumps.

Ailsa Craig

During the year the voltage of the power supply was changed from 4,000 volts to 13,200 volts, this change being necessitated on account of the line being extended to serve Parkhill. The line was originally constructed for the latter voltage so that no additional line expense was necessary on the line already constructed.

Aylmer

During the year assistance was given to the local management in connection with extensions to the system and also *re* operation of the local system.

Beachville

Assistance *re* the billing of all power consumers and the looking after the operation of the system throughout the year was given to the local management.

It is expected that the coming year will see additional power load taken by the three line companies necessitating the increasing of the capacity of our Beachville substation which now has a normal capacity of 225-kv-a.

Blenheim

Arrangements were made for the flour mill to operate on Hydro power as soon as the present power shortage is relieved. This will mean a large increase in the load of the municipality.

Brampton

Assistance was given the municipality respecting negotiations for a continued supply of power to customers in Huttonville. Engineering advice was also given with regard to the distribution system in the town.

Brantford

Engineering assistance was given in connection with taking over by the city the distribution system of the Parkdale District, a section of Brantford Township which was annexed by the city on January 1st.

Brigden

The Brigden Brick & Tile plant installed electric motors throughout their plant and turned on Hydro power, using approximately 50 horse-power, power to be supplied to customer only when available until the present power shortage is relieved.

Chatham

A valuation was made of the distribution system of the Chatham Gas Company by engineers of the Commission, and the Chatham Hydro-Electric System purchased this property by agreement. A portion of this system was left 60-cycle to supply those consumers having 60-cycle motors. The 60-cycle power is supplied by the operation of gas engines and 60-cycle generators in the Chatham Gas Company's power house.

A one-storey brick addition was made to the office building and sub-station, and capacity of the station increased by 1,750-kv-a. three-phase transformer. A 400 horse-power synchronous motor generator set was installed to correct the power factor, and this set will supply the 60-cycle system when additional power can be supplied by the Commission.

Chippawa

Engineering assistance was given in connection with the raising of additional debentures to capitalize the cost of the system.

Comber

Engineering assistance was supplied and arrangements completed to supply additional power customers. A large part of the load is to be summer power.

Dorchester

Assistance was given to the local management *re* extensions to several small power customers, and control switch was installed on this load.

General assistance was given from time to time *re* matters pertaining to the operation of the system.

Dublin

In order to capitalize the cost of additions to the distribution system, it was decided to issue additional debentures. An engineer's statement was prepared and forwarded to the Township of Hibbert, together with the approval of the Commission in order that application could be made to the Railway and Municipal Board for \$1,200.

Elmira

During the year a new office was acquired and equipped for the sale of electrical appliances for the benefit of the users of Hydro current in the village. This arrangement has proved to be highly beneficial not only from the appliance stand-point but in providing a proper centrally located office for the payment of accounts, etc. Assistance has also been rendered to the municipality in arranging their system for the additional load required by the Elmira Rubber Co.

Embro

Engineering assistance was given to the municipality *re* a proposed extension to take care of a small flour and chopping mill at times of low water which is now the owner's source of power.

General assistance in the operation and maintenance of the local system was also given throughout the year.

Exeter

Waterworks Pumping

A layout was made and the installation is now complete in the present station of an electric unit for domestic service automatically operated, comprising a 225-gallon per minute Roturbo pump coupled direct to a 20 horse-power Westinghouse motor for 3-phase, 25-cycle, 550-volt current, located in a pit in order to avoid priming requirements, with Cutler Hammer automatic starter and time clock, allowing of operation during three periods each day, and with automatic pressure regulator and switch for starting and stopping the unit at predetermined water levels in the stand-pipe. The equipment was supplied under contract with Messrs. Goldie & McCulloch at a cost of \$2,082.

Georgetown

Engineering assistance was given the municipality with regard to various matters relating to the distribution system, including the supply of power for a waterworks system.

Glencoe

A 4,000-volt line was constructed from Bothwell to Glencoe to supply the municipality and the street lighting and distribution system remodelled by the Commission. Power was first supplied early in August.

Guelph

Waterworks Pumping

The equipment described in the previous report and covering two domestic electric pumps and one booster for fire service, has now been installed and is in operation, and the assembly of special piping, concrete work of considerable intricacy and maintenance of satisfactory water supply during construction have been carried out by the operating staff of the pumping station in a very creditable manner.

Hamilton

Engineering assistance was given in connection with taking into the city system part of Barton Township system located in district absorbed by the city.

Kitchener

Due to the ever-increasing demands for power in this city, it has been necessary to proceed with the erection of a new sub-station to take care of the power load in the factory district. This station will relieve the main station of approximately 2,000 horse-power and better service can be maintained. Various changes are under consideration, due to the increasing demands in this district. It is expected that considerable increase will be necessary in the high-tension station as well as the local station as soon as additional power is available.

Leamington

Waterworks Pumping

A report has been made with preliminary layout and estimates for one 450-gallon and one 215-gallon electric pumping units for domestic service to be installed in the present pumping station.

Lucan

Assistance was given the local commission during the year in connection with the operation of the system and in making extensions to supply power to the flax mill and chopping mill.

Markham

As the municipality on March 17th, 1919, signed a contract with the Commission for the supply of electric power, and as they were urgently in need of such supply an extension was made from the Scarboro Township system to Markham to furnish a limited amount of power at 4,000 volts. Assistance was given in the remodelling of local distribution system and power was delivered on April 1st.

Merritton

This municipality was formerly supplied with power from the Ontario Power Company, but during the year this contract expired and a contract was made with this Commission for power. Merritton will become a Hydro municipality about the first of the coming year.

Mimico

The phenomenal growth in population of this municipality necessitated alterations in the local distribution lines, and engineering assistance was given looking to betterments to the system. Owing to the extreme power shortage and the consequent limited service that could be given these betterments were reduced to the immediate needs with the idea of further alterations later.

Milton

A number of applications for power were received and arrangements were made for supplying a limited amount during summer months. Assistance was given by the municipal department in arranging for the new loads.

New Toronto

Strong demands were made for considerable additional power by existing customers, which demands could only be met to a very limited extent. Assistance was given the municipality in looking after the local business.

Newbury

Estimates of the cost of supplying power to the municipality and of the cost of a distribution system were furnished by the Commission. Hydro, enabling and money by-laws were voted on in September. A distribution system will be built early in the spring of 1921.

New Hamburg

In order to better the service to the lighting customers some changes were recommended in the distribution system. A rearrangement of the transformers and an increase in the secondary wiring has been made necessary by additional range load, etc.

Niagara Falls

Engineering assistance was given with a view to building a new sub-station to take care of future requirements and to improve the operating features. Also additional debentures were sold to purchase a new transformer to take care of additional loads expected in 1921.

Waterworks Pumping

The 1,740-gallon electric pumping unit detailed in the previous report has been installed. This work is complete.

Niagara-on-the-Lake

Equipment was installed in the sub-station with a view of improving the voltage in that municipality. A report was also made with a view of reconstructing part of their distribution system.

Waterworks Pumping

The new gasoline-driven unit for fire service was described in the previous report. Owing to a series of labour disturbances in the contractor's foundry, shipment is only now being made, and the plant will not be ready for operation before the end of the year.

Parkhill

During the year the distribution system was installed to meet the requirements of the municipality. Power was first delivered in the month of May. Assistance was given during the year in extending lines to serve new customers. It is expected that the coming year will see electric power delivered to a number of additional power customers.

Port Colborne

On March 1st Port Colborne purchased from the O.P. Company the distribution system and signed a contract for power with the Commission, and are now operating as a Hydro municipality. Assistance was given in operating system during the year.

Port Dalhousie

Engineering assistance was given in connection with issuing additional debentures required to pay outstanding accounts and to meet the cost of extensions required in connection with the system.

St. Thomas

Engineering assistance was given to the local Commission *re* extensions to take care of the additional waterworks load and other power loads to be supplied when power supply permits. Arrangements were made for erection of a storage building, estimated cost of which is \$9,000.

Sarnia

Assistance was given by the Commission in the purchase of a building on the main street, this building to be remodelled and used as an office building. This building will be ready for use about December, 1920.

Thamesville

Arrangements were completed to supply power to a flour mill to operate during off peak hours.

Tilbury

The large tile plant which was burned down early in the year and which was electrically equipped was rebuilt and is again operating with Hydro power. Power was also supplied to the small planing mill, and arrangements completed for the installation of 45 horse-power in the Auto Top Factory as soon as power shortage conditions are relieved.

Wardsville

Estimates of the cost of power and of a distribution system were furnished by the Commission. Hydro, enabling and money by-laws were submitted to the rate-payers in October. Power will be supplied early in 1921.

Waterloo

In order to take care of expected loads and to supply better service new station equipment was necessary. An additional station to house three 750-kv-a. 3-phase transformers with modern protective apparatus is being built and will be completed by the first of the year 1921.

West Lorne

From time to time general assistance was given to West Lorne *re* the operation and maintenance of the local system.

It is expected that the coming year will show a considerable reduction in the rate to the municipality and to the local consumers, as the load will increase considerably when additional power is available to supply new loads.

Windsor

The steam plant and distribution system of the Sandwich, Windsor and Amherstburg Railway were valued by engineers of the Commission and the property purchased by Windsor in the month of April. Windsor continued to operate this system as formerly with power supplied from the steam plant as Niagara power was not available.

Waterworks Pumping

The equipment described in previous reports has been installed and is now in operation. Considerable difficulty was experienced from water-soaked soil and interference from pipes and connections forming part of the steam pumping plant, which were in bad condition, but had to be retained during construction, to avoid interruption of service to the city. The steam pumps now have ample and direct connections to the new suction wells, and the interior walls of the station have been opened up, so that the operator may have a comprehensive view of both steam and electric plants. The re-arrangement of discharge mains in the vicinity of the station and the installation of the Venturi meter are also practically completed.

RURAL

The question of supplying power to rural districts has received a great deal of attention during the year, and complete surveys have been made of a large number of townships to obtain data required to put into operation the district scheme of distributing Hydro power to rural districts. The legislation authorizing this method of supplying rural districts was recently obtained, and it is expected that with the co-operation of the farmers interested, a large number of rural lines will be constructed during the coming year.

GENERAL

(a) During the year, general engineering assistance was given the following townships:

Albion, Chatham, Dorchester South, Esquesing, Howard, Orford, Nassagaweya, Puslinch, Toronto, Barton, Dereham, Dover West, Harwich, King, Markham, Norwich North and South, Raleigh.

SPECIAL

(b) During the year special engineering assistance was given to the following townships:

Brantford Township

A valuation was made of the Parkdale section, which was recently annexed by the City of Brantford, with a view of having it incorporated in the city's system.

Etobicoke Township

Numerous applications for electric power and lighting service were received from residents of the township and estimates were made and rates approved covering such service preparatory to the time when sufficient power could be obtained to warrant the building of extensions to serve the new customers.

York Township

During the year, estimates covering numerous extensions to the distribution system were checked and approved preparatory to building so soon as sufficient power is available. Statements were also prepared of the cost of the existing distribution system and all preparations made for the transfer of the system to the ownership of the township.

Scarboro Township

The demand for both power and lighting service greatly increased, and assistance was given the municipality in altering and extending the system. The natural expansion, however, was considerably curtailed owing to the power shortage.

Stamford Township

Engineering assistance was given in connection with building a new sub-station to take care of their present and future requirements, also, with a view of locating the sub-station nearer their present load centre.

West Flamboro Township

During the year, 2,200-volt line was built from Bullock's Corners to Christie's Corners to serve twenty-five farmers and hamlet users. This line is expected to be in operation early in January, 1921.

(c) Rural surveys have been made in the following townships, and estimates prepared to determine the cost of supplying power to many districts in these townships. It is proposed to hold meetings in a number of these townships early in the coming year to explain the manner in which power requirements will be met and the cost of same:

Ancaster, Barton, Beverley, Blandford, Blanshard, Brantford, Burford, Crowsland, Dorchester North, Downie, Flamboro East and West, Grantham, Louth, Nelson, Niagara, Nissouri East, Oakland, Oxford North, East and West, Pelham, Saltfleet, Stamford, Thorold, Townsend, Trafalgar, Waterloo, Zorra East.

ESSEX COUNTY SYSTEM

The Essex County System is operated by the Commission with an office at Leamington, and the financial standing of the system shows considerable improvement over the previous year, and it is expected that a number of important additional loads will be secured as soon as sufficient power is available on the Niagara System.

SEVERN SYSTEM

GENERAL

Assistance was given by the Commission to the various municipalities on the system in the nature of engineering advice covering matters pertaining to the general operations of the various local Distributing Systems.

An analysis of the operating statement in the various municipalities was also made for the purpose of determining equitable rates for each class of service as well as to ascertain the amount of refund above cost due each corporation for energy supplied for public service. The various towns for which this assistance was rendered are as follows: Alliston, Barrie, Beeton, Bradford, Coldwater, Collingwood, Cookstown, Creemore, Elmvale, Midland, Penetang, Port McNicoll, Stayner, Thornton, Tottenham, Victoria Harbor and Waubaushene.

Assistance was also given to the following towns in connection with the preparation of money by-laws and the obtaining of approval of same from the Ontario Railway and Municipal Board to cover the capital cost of extensions and improvements to the Local Distribution System over and above the first cost as covered by the original money by-laws: Alliston, Cookstown, Thornton, and Port McNicoll.

Barrie

Assistance was given the local officials in connection with executing an agreement and constructing an extension to the Local Distribution System for the purpose of serving the Grand Trunk terminal and shops at the Company's divisional point at Allandale. The approval of the Commission was requested and obtained covering the use of surplus funds for the purpose of constructing an addition to the office building of the Local Hydro Utility to provide for more adequate quarters for the staff and more suitable space for the sale of appliances.

Camp Borden

A new agreement was prepared and executed with the Air Board of Canada covering service at the Aviation Camp at Camp Borden and providing for the assuming of all of the obligations of the existing agreement with the Department of Militia and Defence.

Midland

Assistance was given the local officials in connection with executing an agreement with the Grand Trunk Railway for the Grand Trunk Pacific elevator at Midland, and an investigation was made covering extensions to the local system and the construction of a sub-station for this purpose and estimates and rates were prepared accordingly. Arrangements are being made for serving two addi-

tional terminal elevators now "steam" operated, and also for a thousand-barrel flour mill now under construction. It is anticipated that by the close of 1921 the demand for power in this municipality will have increased by approximately 200 per cent.

Port McNicoll

Due to the existence of a large sub-station serving the C.P.R. elevator and terminal at this village, arrangements were made during the year for dismantling the local sub-station and serving the village from the C.P.R. sub-station. An investigation was made covering the saving involved by this method and estimates were prepared and submitted to the municipality accordingly. Assistance was given the local officials in connection with the preparation of a money by-law to cover the cost of constructing a tie line between the C.P.R. sub-station and the village and all arrangements made for making the change as mentioned above early in the coming year.

RURAL.

Petitions having been received from prospective customers in a number of different townships located in the district served by the Severn System, complete investigations and surveys were made in these townships for the purpose of ascertaining the possibility of serving all customers located within the boundaries of each, under a uniform rate irrespective of the small sections covered by special petitions. Estimates and rates were prepared based on such surveys and investigations and distributing systems were designed covering rural service to each and every farm in each respective township. This work was performed in the following: Innisfil, Tecumseh, West Gwillimbury and parts of Flos, Nottawasaga and Tay Townships.

EUGENIA SYSTEM

GENERAL

An analysis of the operating statements of the various municipalities was prepared for determining rates for the coming year as well as for the purpose of determining the amount of refund due each corporation from its local Hydro System for energy supplied for public service.

Assistance was given to the following municipalities in the nature of engineering advice pertaining to the general operation of the local system: Arthur, Chatsworth, Chesley, Dundalk, Durham, Elmwood, Flesherton, Grand Valley, Hanover, Holstein, Markdale, Mount Forest, Neustadt, Orangeville, Owen Sound, Shelburne and Tara.

An investigation was made concerning the possibilities of supplying the following municipalities in the northern section of Peel County from the Eugenia System and estimates were prepared accordingly: Alton, Caledon Village, Caledon East, Erin, Hillsburg and Inglewood.

Bruce County District

Based on investigations and estimates prepared during the previous year, arrangements were made for constructing transmission lines and sub-stations in Bruce County, consisting of an extension of the Eugenia System transmission lines

to serve various towns in that section of the Province, such as Teeswater, Wingham, Lucknow, Ripley, Kincardine, Fordwich, Gorrie and Wroxeter.

The construction of these lines and stations was begun and the work practically completed before the close of the fiscal year. An investigation was made for extending these lines into the northern part of Huron County for the purpose of serving additional municipalities.

Ayton

Investigations were made by the Commission concerning delivery of Hydro-Electric power to this municipality, both by way of Neustadt and Holstein, and estimates were prepared and submitted accordingly. Enabling and money by-laws were submitted to the ratepayers and carried, and assistance was rendered by the Commission in placing both questions before the people.

Derby Township

An investigation and survey was made covering service to the entire municipality of Derby Township, and also covering a small section of same in the vicinity of Kilsyth.

Estimates and rates were prepared and submitted accordingly.

Fordwich

A distribution system was designed for this municipality and estimates prepared and submitted covering the construction of same, also covering the delivery of Hydro-Electric power from the Eugenia System. An enabling by-law was submitted to the ratepayers and carried and assistance rendered by the Commission in placing this question before the electors.

Gorrie

An investigation was made concerning delivery of power to this municipality from the Eugenia System, and estimates were prepared and submitted accordingly.

A distribution system was designed and estimates prepared covering the construction of same. An enabling by-law was submitted to the ratepayers covering the delivery of Hydro-Electric power to the municipality and assistance was rendered by the Commission in connection with same.

Hanover

The sub-station in this municipality was enlarged and extended and additional equipment added to provide for an increase of load. Extensions were made to the distribution system for the same purpose. Two large furniture factories, a new flour mill and additional power for the cement mill being industries for which these extensions were required. Assistance was rendered by the Commission in making these extensions and in preparing a money by-law to cover the capital expenditure for same. It is estimated that by the end of the year 1921 the load in this municipality will have increased by nearly 200 per cent. over the year 1920.

Howick Township

A survey and investigation was made in this township for the purpose of obtaining information on which to base estimates covering the cost of constructing

distributing lines for the purpose of serving farmers in the entire township with Hydro-Electric power and also for the purpose of determining rates for such service.

Kincardine

A distribution system was designed and estimates based on same prepared and forwarded to the municipality. A money by-law based on these estimates was submitted to the ratepayers and carried. Assistance was given to the municipality in connection with constructing a distribution system as well as constructing a sub-station for the purpose of providing for Hydro-Electric service in the municipality. It is expected that power will be delivered to this town early in 1921.

Waterworks

Following an inspection of the site, a layout has been made with report and estimates of electric pumping equipment, covering low-lift pumps (one of which will be steam-driven) for supply of lake water to a filter plant already arranged for, two domestic units each of 350 g.p.m. capacity, 245 feet head, coupled to a 50 horse-power motor, and one gasoline-driven fire pump of 800 g.p.m. capacity at 305 feet head coupled to a 6-cylinder engine.

Lucknow

Money and enabling by-laws were submitted to the ratepayers during the year and both questions carried unanimously. A distribution system was constructed for the municipality by the Commission and arrangements made for placing same in operation early in the New Year.

Meaford

A valuation was made of the development and distribution system belonging to the private company serving the town, for the purpose of arranging the purchase of same. Estimates were prepared and submitted covering the delivery of Hydro-Electric power to the town from the Eugenia System.

Neustadt

Assistance was rendered to this municipality by the Commission in connection with constructing extensions to serve new power customers. Estimates were prepared and arrangements perfected for restraining the transmission line from Hanover to Neustadt with a conductor of greater cross-section to take care of this additional load. An increase in power demand in this municipality for 1921 over and above 1920 conditions is estimated to approximate nearly 100 per cent.

Owen Sound

Extensions were made to the distribution system in this municipality to take care of a considerable increase in load due to the fact that a number of furniture factories were forced to become users of electric energy on account of the high cost of coal. The estimated increase in load for supplying these additional industries will approximate an increase of nearly 80 per cent. when the work in connecting same is completed.

Priceville

Enabling and money by-laws were submitted to the ratepayers during the year, and both by-laws were carried almost unanimously. A distribution system and sub-station were constructed for the village by the Commission, and arrangements made for delivering power early in the New Year.

Ripley

Assistance was rendered by the Commission to the village in submitting money and enabling by-laws. A distribution system was designed, and construction work on same started during the year.

Power will be delivered to this municipality early in 1921.

Port Elgin

A valuation was made of the local distribution system in this municipality for the purpose of negotiating the purchase of same by the municipality to facilitate the delivery of Hydro-Electric power from the Eugenia System.

Estimates covering the supply of power were prepared on this basis. An enabling by-law covering the delivery of power from the Commission was submitted to the ratepayers and carried.

Southampton

A valuation was made of the development and distribution system of the private company serving this municipality with the idea of arranging the purchase of same and operating the plant in parallel with Eugenia System for the purpose of supplying power to both Southampton and Port Elgin.

Teeswater

Enabling and money by-laws were submitted to the ratepayers during the year, and both questions were carried almost unanimously. A distribution system and sub-station were designed and constructed for the municipality by the Commission and both will be placed in operation early in 1921.

Wingham

Estimates were prepared covering the cost of reconstructing the local distribution system. A money by-law was submitted to the ratepayers and carried almost unanimously. Assistance was given to the municipality in securing and arranging for serving several large power customers. Arrangements were made for starting the reconstruction of the distribution system, which will be undertaken and completed in 1921.

Wroxeter

A distribution system was designed and estimates prepared in connection with same and submitted to the local officials. Assistance was given in connection with submitting an enabling by-law to the ratepayers; this by-law was carried by a large majority.

Walkerton

A valuation was made of the generating station and distribution system of the private company serving the town, for the purpose of arranging the purchase of

same in connection with serving Walkerton with Hydro-Electric power. An investigation was made of this plant with the idea of constructing an extension and improvements to same to provide for paralleling with the Eugenia System so as to supply power to Walkerton and the adjacent municipalities.

RURAL

Following out the policy outlined by recent legislation in respect to the distribution of electric power in rural districts, surveys were made in various townships in the Eugenia district covering possibilities of serving all farms located in each, irrespective of small sections covered by special petitions which had been forwarded to the Commission requesting service for a particular locality. Based on such surveys a complete investigation was made concerning rates for serving each farm, and estimates were prepared and distribution systems designed for serving entire townships. This work was performed especially for the Townships of Derby, Amaranth and Howick, located on the Eugenia System. Consideration was also given to serving parts of Artesmesia, Protön, Normanby, Egremont, Collingwood and Osprey Townships.

WASDELL'S SYSTEM

GENERAL

An analysis of the operating reports of the various towns was made to determine equitable rates as well as to ascertain the amount of refund due the various corporations for energy supplied by each local system for public service purposes.

Assistance was rendered to the various towns in the district by the Commission in matters pertaining to the general operation of their local distribution systems. The municipalities for which this service was rendered being as follows: Beaverton, Brechin, Cannington, Sunderland and Woodville.

An investigation was made in connection with constructing new lines and sub-stations constituting extensions to existing lines for the purpose of serving loads in various townships in the district as well as the municipalities of Uxbridge and Port Perry.

The steel conductor on the transmission line from the development to Beaverton was restrung with aluminum for the purpose of taking care of additional load at Kirkfield and future loads south of Beaverton.

Kirkfield

The transmission line from Gamebridge to Kirkfield was completed and the sub-station at the Crushed Stone, Limited, plant placed in operation during the year for the purpose of supplying power to the company as well as the Police Village of Kirkfield. Enabling and money by-laws were submitted to the rate-payers of the village and carried almost unanimously.

A distribution system was designed and constructed and placed in operation during the year.

Mount Albert

An enabling by-law was submitted to the ratepayers in this village and carried almost unanimously, estimates being based on power obtained from a proposed sub-station to be located at Uxbridge, and a complete investigation was made and all information submitted to the village in connection with same.

Port Perry

A distribution system was designed, estimates prepared and submitted covering Hydro-Electric service for this village. Enabling and money by-laws were submitted to the ratepayers and assistance rendered in connection with same by the Commission and both by-laws carried almost unanimously.

Uxbridge

An investigation was made covering service to the municipality of Uxbridge, and the location of a sub-station at that village for the purpose of serving same with Hydro-Electric power as well as adjacent townships. A distribution system was designed, rates and estimates prepared and money and enabling by-laws submitted to the ratepayers and carried, based on power being supplied by the Commission from the Wasdell's System.

RURAL

Petitions were received from various townships asking for rural service in certain sections of each, and following the policy covered by recent legislation in connection with distribution of electric energy in rural districts complete surveys were made covering service to each farm in these various townships on the Wasdell's System. Based on the data secured from such surveys, estimates and rates were prepared and distribution systems designed covering transmission lines throughout each township. The townships for which this work was performed are as follows: Brock, Eldon, Mariposa, Reach, Scugog, Scott and part of Georgina, Uxbridge and West Gwillimbury.

MUSKOKA SYSTEM

GENERAL

Assistance was rendered to both Gravenhurst and Huntsville by the Commission in matters pertaining to the general operation of the local distribution system.

Bracebridge

An analysis of the operating statements of various years of the Electric Light & Power Utility of this municipality was prepared and submitted and a complete investigation made in connection with rates charged to local customers for the purpose of ascertaining the equity of existing rates in force for each class of service. Estimates were prepared and submitted covering a supply of power to this municipality from the Muskoka System transmission lines and generating station.

Gravenhurst

An investigation was made covering the supply of power to Gravenhurst Sanitarium and a valuation was made of the distribution system supplying same and rates prepared governing service. An investigation was made concerning the transmission line from the South Falls plant to Gravenhurst to determine the maximum load which could be carried in connection with giving service to the Potash Company.

Huntsville

Estimates were prepared and submitted covering additional power required by the Anglo-Canadian Leather Company. Estimates were also prepared and submitted covering the cost of constructing a portable sub-station for the purpose of supplying power in connection with the construction of provincial roads north of Huntsville.

THUNDER BAY SYSTEM

Fort William

As the Municipality of Fort William executed an agreement with the Commission at the same time as the City of Port Arthur, prior to commencement of construction work on the Cameron's Falls Development, considerable work was undertaken and investigations made in connection with securing a suitable location for a station site which would be satisfactory for supplying power to both municipalities. Estimates were prepared covering the delivery of power from Cameron's Falls Development to existing and prospective industries in Fort William. As the agreement between the Kaministikwia Power Company and the City of Fort William has not yet expired, consideration was given to the construction of distributing lines in this municipality to take care of large power customers direct from the Commission's transmission lines independent of the existing local distribution system. Until more definite information was available as to Fort William's loads, arrangements were made to take care of existing customers in the city desiring service from the Commission, by means of an additional feeder from the temporary terminal station located at Bear Point.

Nipigon Village

Investigations were made covering service to the Nipigon Fibre & Paper Company, located at the Village of Nipigon. Estimates and rates were prepared and a contract executed for supplying power to the company.

Port Arthur

Estimates and rates were prepared at various times covering a delivery of various amounts of power to this municipality from the new Cameron's Falls Development for the purpose of supplying power to new industries. Assistance was rendered to this municipality in connection with closing contracts for supplying power to the Canadian National Elevator and the Kaministikwia Pulp & Paper Company. The demand for power in Port Arthur during the year increased steadily, necessitating the ordering of additional amounts from time to time from the Kaministikwia Power Company and the indications at the present time are that a number of new pulp and paper mill industries will be established in the city during the coming year, which, together with the extensions being constructed to existing industries will require additional amounts of power from the new development at Cameron's Falls. Assistance was rendered to the local officials in connection with general operating matters pertaining to the Port Arthur Distribution System.

NIPISSING SYSTEM

GENERAL

This system supplies power to the municipalities of North Bay, Powassan, and Callender and is operated by the Commission in a similar manner to the Central Ontario System. After careful investigation and preparation of estimates several storage dams were constructed on the South River for the purpose of conserving water and regulating stream flow to provide for additional power to the generating station supplying the district. An investigation was made, estimates prepared and arrangements were perfected for overhauling the turbines and generators at the generating plant and installing new units and transformers for the purpose of increasing the total capacity of same so as to provide for growing loads in the district as well as for the purpose of doing away with the steam plant located in North Bay, which has been used in the past in connection with the hydraulic generating plant for supplying the power requirements of the various municipalities.

NEW ONTARIO DISTRICT

GENERAL

Whereas there are no towns under contract with the Commission in this district, considerable work has been performed for various municipalities located in same and requests have been received at various times for engineering advice and assistance in solving problems relating to the supply of power for individual municipalities, details of which follow:

Cochrane]

A valuation was made of the local distribution system belonging to the private company supplying service to the town and rates and estimates prepared covering service under municipal ownership and assistance given to the municipality in connection with the purchase of the property.

Capreol

Engineering advice and assistance was given to this municipality in connection with the design and installation of a distribution system and in obtaining a supply of power from one of the various developments located adjacent to same.

Kenora

Assistance was rendered to this municipality in connection with the negotiation of the sale of its development to a private corporation, and the conditions under which the operation would be carried on in future by such an arrangement, and an engineer of the Commission visited this municipality for this purpose.

Mattawa

A valuation of the private owned plant and distribution system in Mattawa was prepared and submitted for the purpose of negotiating the purchase of same and operation under municipal ownership. Estimates and rates were prepared and submitted covering service under such conditions and assistance rendered to the municipality in negotiating purchase from the company.

Monteith

Assistance was rendered to the Department of Agriculture in connection with remodelling and operating the development at Monteith, constructed for the purpose of serving the Demonstration Farm and the Military Training Station, as well as the village with electric energy for lighting and power purposes.

Parry Sound

Assistance was rendered to this municipality by the Commission in connection with placing its new plant in operation and in connection with determining rates for charging various classes of customers supplied from same, and engineers of the Commission visited this municipality at various times for this purpose.

Sturgeon Falls

Assistance was rendered to this municipality in connection with negotiating for a supply of power from the Spanish River Pulp & Paper Company, and in connection with the granting of the Crown Lease for development at Smokey Falls by the company.

South River

Assistance was rendered this municipality in connection with the preparing of a valuation of the private owned company's plant and in determining rates for service under municipal ownership.

CENTRAL ONTARIO SYSTEM

GENERAL

The construction of the tie line between Peterboro and Healey's Falls opened up a new area in the system, making possible economical rates to Norwood and Havelock.

The general growth of load has been satisfactory, and the system load now exceeds the load in the munition manufacturing period.

The Ranney's Falls plant, with a rating of 10,000 horse-power, is expected to be in operation in the Fall of 1921.

Bloomfield

The power load has been increased by the addition of one canning factory and a milk condensery.

A by-law has been passed to borrow \$5,500 for the purpose of extending the street lighting system to the limits of the village. Construction will be carried out next Spring.

Cobourg

Due to the increasing demand, chiefly for factory purposes, a new electric unit has been installed in the pumping station, supplied by Messrs. Goldie & McCulloch, and consisting of a Roturbo, 4-stage pump of 1,000 Imp. g.p.m. at 240 feet total head, coupled to a 100-horse-power Westinghouse 3-phase, 60-cycle, 2,200-volt motor, operating at 1,150 r.p.m., the contract price being \$3,838.

Arrangements are being made to have the four present 750-gallon electric pumps fitted with new impellers to give increased head and decreased volume, in accordance with the demand for higher pressure in the mains.

Installation has also been made of chemical toilets in the engineer's residence and pumping station.

Havelock

A by-law was passed to issue debentures for \$28,900.00 to purchase the existing distribution system of the Havelock Electric Light and Power Co. and to reconstruct this system. This reconstruction is under way, and the construction of a feeder from Norwood Transformer Station is also going on. It is expected that the lines will be made alive early in 1921.

Kingston

A 10% rate reduction was put into effect at the first of the year.

Lakefield

A by-law was passed in January to issue debentures for \$33,500 to purchase and reconstruct the local distribution system of the Lakefield Electric Light Co. A contract was signed for supply of power by the Commission. Construction was rushed owing to the destruction by fire of the Lakefield plant. Service was given July 19, and the distribution system is now practically completed.

Power was supplied to a saw-mill, a construction company and a grist mill. A demand of 120 k.w. was established.

Marmora

By-laws were passed in January and a contract was signed for supply of power by the Commission. Fourteen thousand dollars is to be spent in remodelling the distribution system. The construction is being carried on now. The outdoor type transformer station is also under construction. The system will be in operation before the end of the year.

Norwood

A by-law to issue debentures for \$33,100 was passed to purchase the local electric light system and provide a new distribution system. A contract was signed for supply of power by the Commission. The new distribution system is practically completed, and service is expected through Norwood Transformer Station early in 1921.

Omemee

The Omemee Tanning Co. is building additions to its plant, and has signed a power contract for 150 horse-power.

Oshawa

Plans were prepared and considerable work has been done to improve the distribution system to take care of the rapidly-increasing load.

A new blast unit for the generators in the gas plant is being installed, consisting of a Sturtevant special blower, direct-connected to a 20-horse-power 3,460-r.p.m., C.G.E.-motor, at a cost of about \$1,200, and the holder capacity has been

increased by the addition of a second lift. Due to irregularities in the holder tank, discovered when this was pumped out, it has been found necessary to provide for additional outerguide framing to the upper lift, and the necessary structural steel will shortly be erected.

Additional boiler capacity has been provided for the present plant, and tenders have been called for on a complete coal-gas plant with vertical retorts and modern equipment, having an ultimate capacity of 200,000 cu. ft. per day.

Peterboro

Radial Railway.

New track has been laid on George Street from the C. P. R. Station to Romaine Street.

Gas Plant.

Owing to the increased demand for gas, the present purifier plant is now too small for economical operation, and a layout doubling the capacity is being prepared, provision having been made in the original plant for such increase.

A steam-driven booster has been installed to give higher pressure than can be thrown by the holder during the mid-day period of maximum consumption, and modern tar and oil separators are being installed to purify the effluent from the works before this is discharged to the river.

A coal conveyor from a pit under the railway siding to the storage pile has been constructed and is expected to be in operation shortly.

Utilities Commission.

The removal of wood poles on George Street and Charlotte Street was completed. Considerable reconstruction of the distribution system was carried out and a large number of old poles removed from the streets. The power load had increased until it exceeds the load carried during the war.

Picton

The power load has increased very satisfactorily.

Considerable work has been done on the reconstruction of the distribution system.

A visit of inspection was made to the pumping station, and the installation of electric units and connections to the present system found satisfactory. The work referred to in the 1919 report has been completed.

Stirling

The sub-station at Stirling has been changed from single-phase to three-phase to enable the town to supply service to a grist mill.

Tweed

The street lighting transformer has been moved from the old steam plant to a location in the centre of the town, and will be controlled by a time switch.

Wellington

The local distribution system was completed early in 1920, and most of the poles of the old Niles system have been removed from the streets. The main street-lighting fixtures have been equipped with frosted globes.

RURAL

Rates for farm service have been submitted and public meetings held, at which the rates were explained to the petitioners, in the following townships: Brighton, Darlington, Thurlow.

Rates for farm service have been submitted to the following townships: Camden, Fenelon, Hallowell.

Rates for street lighting have been submitted in the following townships: Whitby, East Whitby, Asphodel, Pickering.

A survey was made and estimates are in preparation for farm service in the townships of Hamilton, Haldimand, Cramahe and Brighton.

A public meeting was held in North Monaghan Township with reference to suburban and rural service from Peterboro.

H.E.P.C. Pulp Mill

A broken grinder frame was successfully repaired at short notice by electric welding, also a broken bearing cap on the 1,200-horse-power motor, both these repairs being executed at the Davenport Works of the Canadian Allis-Chalmers Company.

Tenders have been called for on a second 1,200-horse-power motor, 257 r.p.m., 2,200 volts, to replace a smaller motor which is of insufficient power to operate the six pockets on the present grinders.

Consideration has also been given to the increase of grinding capacity by 50 per cent., and proportional additions to equipment of wet machines and presses.

An additional boiler, 72 in. x 17 ft. 6 in., has been purchased for the plant at Bancroft, and a contract has been let to the Wm. Hamilton Co. for complete mechanical equipment of log-haul, slasher, barking drum, conveyors and transmission machinery for a new rossing plant, the capacity of the 8-ft. x 30-ft. drum to be 100 cords per day of 10 hours, the contract price being \$23,440, and complete delivery is expected by the end of December. Final drawings of the layout, foundations and framing of the slasher-house are now being prepared.

RIDEAU SYSTEM

GENERAL

Marked progress has been made by the municipalities on the Rideau System during the past year, the lighting and power loads in each town having greatly increased, and the number of consumers having become more numerous. The amount of power taken from the Commission has more than doubled, the Town of Smith's Falls alone having increased its load during the past two years from 400 to 1,000 horse-power. This showing is all the more remarkable when it is considered that until this year the System has always laboured under the disadvantage of a shortage of power which, during the first months of this year, became most acute in the towns of Smith's Falls and Perth, owing to the low water conditions prevailing on the Rideau River. It was, therefore, a great relief to all concerned when, on May 1st, 1920, the Commission completed the new power development at High Falls on the Mississippi River and started to deliver power, thereby providing the System with a source of power ample for its needs, and having a reserve capacity of 1,500 horse-power for future development.

The municipalities concerned have now three sources of power, viz., High Falls, the Rideau Power Company, and Carleton Place Generating Station, which is shut down, and acts as a stand-by plant for the System, assuring them a continuous and ample supply of power for the future.

An analysis of the operating statements of the municipalities is being prepared for the purpose of investigating the application of the lighting and power rates, as well as the rates charged for street lighting and the operation of the waterworks pumping plant.

Two additional municipalities have passed their enabling and money by-laws, and will be added to the System during the coming year, while an estimate has been prepared showing the cost of 400 horse-power for a private company who proposes to take power from the Commission on this System.

Smith's Falls

The amount of power taken by this municipality from the Commission has increased from 450 horse-power in October, 1919, to 1,052 horse-power in October, 1920, this increase being due to the closing down of the local hydraulic plant and large additional power loads taken by existing consumers.

A considerable amount of work has been done by the municipality in remodelling and extending its distribution system to take care of increasing business. Two large power users have greatly increased their power load, while a great number of lighting consumers have been added to the System.

Waterworks Pumping

Tests were made on the domestic units installed in the pumping station, described in the previous Report. This work is completed.

Perth

During the year the load in this municipality has increased from 342 horse-power to 557 horse-power, due to closing down local generating plants and general extension of business. Remodelling of the distribution system has been carried on, and a new series street lighting system installed in place of the old town arc light system. Two new factories have changed over from steam to electric drive during the year.

Carleton Place

This municipality has been receiving its power from the Commission's station at Carleton Place, which was purchased in May, 1919. During the year the 26,000-volt transmission line connecting this municipality to the supply of power from High Falls was completed. The old generating station has been remodelled to take 3 250-kv-a. 26,400/2,200-volt transformers, with the necessary high-tension switching.

The Carleton Place load has increased from 514 horse-power in October, 1919, to 694 horse-power in October, 1920, this increase being due to increased power loads taken by the local woollen industries.

Lanark

The Village of Lanark has this year passed its enabling and money by-laws. Estimates were prepared by the Commission showing the cost of power and the cost of a new distribution system in the village.

Kemptville

Estimates on the cost of power and the cost of a new distribution system were prepared by the Commission and submitted to the Village of Kemptville. The municipality has passed its enabling and money by-laws and is about to conclude a contract with the Commission. Its estimated load for the first year will be about 75 horse-power. Negotiations are in progress for purchasing the old privately-owned plant.

Arnprior

At the request of the municipality, investigations were made regarding service given and rates charged by the Galletta Power Company in the Town of Arnprior. A report on the subject was prepared and recommendations forwarded to the municipality.

Rural Surveys

Surveys were made of the rural district in the vicinity of Lanark and Kemptville to determine if the farmers in this district could be served with light and power. Estimates and rates to farmers in these districts have been prepared, and will be submitted to the petitioners early during the coming year.

ST. LAWRENCE SYSTEM

With a more adequate supply of power available for this district, definite efforts were made to extend the system. New lines were under construction to serve a number of municipalities which had passed the necessary by-laws and signed agreements for a supply of power. Requests were received from many municipalities for information on supply of power, estimates of cost of power and manner of procedure. Assistance was rendered these municipalities and information supplied on amount of power required, cost of such supply, etc. Information was also supplied these municipalities in regard to cost and extent of local distribution system adequate to serve the possible business available. A number of requests were received for estimated cost of large blocks of power to prospective industries in search of suitable location.

Some study was devoted to the problem of transmitting power economically over the System. Growth of loads will eventually necessitate radical changes, and investigation was made into the most desirable manner of altering the lines and stations for increased voltage. A definite plan of procedure cannot be decided upon until the quantity of power or rate of growth of load is known.

Alexandria

Following negotiations between the municipality and the Commission, enabling and money by-laws were passed in January, 1920. The local distribution system has been rebuilt for 4,000-volt operation. The 300-kv-a. pole-type transformer station to serve the municipality is nearing completion, and it is expected that service will be supplied early in 1921 from a 26,400-volt transmission line being constructed from the Cornwall High-Tension Station.

Waterworks Pumping

From data furnished by the municipality, recommendations and estimates have been made for electric domestic pumping and gasoline-driven fire service, and a contract has been let to the Canadian Allis-Chalmers Co. for one 250-gallon pump at 205 feet head, coupled to a 30 horse-power induction motor.

Apple Hill

Hydro enabling and money by-laws were passed in January, 1920, providing for a supply of Hydro power from the Alexandria district line which will pass through the police village. The privately-owned direct-current distribution system has been purchased by the municipality, and is being re-built for 4,000-volt, three-phase operation. Power will be delivered early in 1921.

Avonmore

Requests were received early in the year for estimates on a supply of power from the St. Lawrence System. Estimates of the cost of power and of the cost of building a distribution system were prepared and submitted to the municipality. Enabling and money by-laws will be submitted early in 1921. It is proposed to serve this district by a 4,000-volt rural line from Apple Hill.

Brockville

A considerable increase in load has been effected by the addition of new power contracts. Rural extensions to the Brockville Asylum Farm and St. Mary's College have been put in operation. A number of estimates were made for supply of power to proposed new industries desiring a suitable location.

Waterworks Pumping

Revision for increased population has been made on previous reports, recommending motor-driven units for domestic service, with booster and stand-by gasoline units for fire service.

A pitot survey of waterworks mains and losses of system was undertaken. A number of excessive losses were located, station meters were checked and were found to be correct. A recommendation was made covering installation of sufficient valves to adequately sectionalize the mains.

Casselman

A valuation was made of a privately-owned distribution system in the village. Estimates on the cost of a new distribution system and on the cost of a supply of power to be delivered over a 4,000-volt line from Maxville, have been prepared and are ready to submit to the municipality.

Chesterville

Alteration in retail rates was necessary owing to increased cost of power from the new source at Cornwall. This required careful study of local operation costs and revenue, also the probable growth in business. Efforts were directed toward extending rural lines out of the municipality, and some success in this direction was attained.

Cornwall

In December, 1919, an effort was made by the Stormont Electric Light Company to have its franchise renewed for ten years. Opposition to this move was evidenced by a portion of the municipal voters and influential citizens. Assistance was rendered by the Commission to oppose the granting of this extension, and the by-law was defeated when voted upon.

The municipality has been active in trying to secure location for prospective industries, and the Commission has furnished estimates to a number of industries desiring cost of power in this locality. The Toronto Paper Company, which is now receiving power in this district, is making extensive additions to its plant, and will require a considerable increase in power.

Finch

Requests were received from the municipality early in the year for estimates on the cost of Hydro power. A survey was made and estimates prepared on the cost of power, and also on a new distribution system for the village. Enabling and money by-laws will be placed before the ratepayers early in January, 1921. It is proposed to serve this village and district by a 4,000-volt rural line from the Chesterville substation.

Lancaster

Enabling and money by-laws were passed early in the year. A comprehensive distribution and street lighting system is being installed, and the village will receive power early in 1921 over a standard 4,000-volt rural line from the substation at Martintown.

Martintown

The police village of Martintown contracted early in the year for a supply of power. A distribution and street lighting system is being installed, and power will be supplied early in 1921 from a 150-kv-a. pole-type transformer station located north of the village limits.

Maxville

The Village of Maxville passed enabling and money by-laws in connection with Hydro-Electric service in January, 1920. During the year a modern distribution and series street-lighting system has been installed. Service will be supplied to the municipality early in 1921.

Newington

In response to requests from the Police Village of Newington, surveys were made to determine the best manner of serving the municipality and district. Estimates were prepared on the cost of power and also on the cost of a modern distribution and street-lighting system. Enabling and money by-laws will be placed before the ratepayers early in 1921. It is proposed to supply this police village from a standard 4,000-volt rural line from Chesterville via Finch.

Prescott

Investigation into the existing retail rates required the adjustment of street lighting tariff, which had never been altered since the inception of Hydro service. With this adjustment it was not considered necessary to make further alteration of retail rates to meet the increased cost of power to the town from Cornwall. The municipality has purchased a small electrically-driven turbine pump, driven by a

25 horse-power induction motor. The present unit for pumping was too large and unsuitable conditions prevented the town using it for pumping at off-peak periods.

Spencerville

On the request of municipal officials, estimates are being prepared on the cost of power to be supplied over a standard rural line from the Municipality of Prescott.

St. Isidore de Prescott

Following a request received from the Trustees of the Police Village of St. Isidore; surveys were made to include this village in a proposed extension north of Maxville. Estimates were prepared and submitted, and Hydro by-laws will be placed before the ratepayers in January, 1921.

Williamsburg

A 50-kv-a. 26,000/2,200-volt single-phase, pole-type transformer station is being installed to serve the police village. Service was formerly obtained over a 2,300-v. three-phase line from Morrisburg. Owing to the Commission's being notified that this service could not be continued by Morrisburg, the above station was necessary.

Winchester

Owing to increased cost of power supplied from the new source at Cornwall, retail rates were increased. A study of local operation was made to determine what would be an equitable increase of retail rates. This required collecting data, including an up-to-date map of the lines in the municipality, operating costs, revenue and possible natural growth of business.

Winchester Springs

This municipality has been waiting long for Hydro service. Requests were made in the early development of the system, but owing to insufficient supply of power, delay was unavoidable. The municipality finally voted on the necessary by-laws and signed an agreement for power. Two schemes for serving the municipality are under consideration. One requires a transformer station erected in the municipality adjoining the existing transmission line; the other requires erecting a line from Williamsburg and including service to rural customers. One of these schemes will be decided upon during the winter, when the rural district will be canvassed.

St. Lawrence Rural Districts

Exhaustive surveys were carried on in the following townships to arrive at the best method of serving farms and hamlets where petitions have been circulated. Estimated rates are being prepared to determine the cost of supplying power to many districts in these townships, and rates will be submitted to the petitioners during the coming year:

Glengarry County: Lancaster Township, Charlottenburg Township, Lochiel Township, Kenyon Township.

Prescott County: S. Plantaganet Township.

Russell County: Cambridge Township.

Stormont County: Roxborough Township, Osnabruck Township, Cornwall Township, Finch Township.

Dundas County: Winchester Township, Mountain Township, Williamsburg Township, Matilda Township.

Grenville County: Augusta Township, Edwardsburg Township.

Leeds County: Elizabethtown Township.

SECTION VII

GENERAL ACTIVITIES OF THE COMMISSION

ELECTRICAL INSPECTION DEPARTMENT

The past fiscal year closed the biggest year in the history of the Commission's Electrical Inspection Department. This is due in a large measure to the extensive building operations throughout the Province and to the ever-increasing demand for electric light and current-consuming devices for domestic purposes, such as electric irons, toasters, grills and other cooking utensils, the washing and sewing machine motors, and the innumerable other conveniences for the saving of time and labour. There has been a wonderful change in the last few years and the people are no longer willing to content themselves with the older methods. This is borne out by the fact that the records of the Electrical Inspection Department show a large percentage of permits filed have been for the wiring of new houses and fixture installations, and extra wiring to existing installations for the attachment of heaters and other devices of all kinds, and during the year the Department received 87,399 paid applications for new wiring, while 160,990 inspections were made.

The efforts of the Department, however, are not alone confined to the inspection of new installations, as considerable time has been devoted to the inspection of the older ones and have been successful in having improvements made in old and defective wiring, which has been remodelled or replaced by new wiring and equipment, at an approximate expenditure of \$557,033. In spite of the high cost of labour and materials, little difficulty was experienced in persuading the owners or tenants of buildings of the necessity of overhauling old and obsolete installations, which in many instances constituted both a fire and life hazard.

The annual permit arrangement is rapidly gaining favour with owners of industrial plants, mercantile buildings, other establishments and institutions employing their own staff of electricians, as by paying an annual fee (which is determined by the number of employees of the plant to be inspected) a permit is issued which not only obviates the inconvenience to the owners of such plants having to take out separate permits, as required by the Act, for each individual change they require to make to the existing installation, but entitles them to an inspection at least once a month, or more frequently if occasion demands. A written report is forwarded to the owners following each inspection, which keeps them fully informed as to the amount and class of work which is being done by their electricians, and at present practically all the industrial plants throughout the Province have, on account of the benefits which they have derived from this arrangement, made contracts for annual permits with the Commission and a considerable revenue is derived from this source alone.

RURAL POWER

Owing to the high cost of construction, existing labor conditions and shortage of power in the Niagara District, the Commission has confined its efforts to the making of surveys in districts from which petitions have been received.

At the Commission's request the legislation was passed amending the Power Commission Act so as to provide for the supply of power to rural districts so that systems need not necessarily be confined to the limits of geographic township boundaries, but could be arranged to provide for the most economic distribution of power from the nearest distribution centre. The Act, as amended, is as follows:

30e. Subject to the approval of the Lieutenant-Governor in Council, Contracts for construction and operation of distribution works in townships the Commission may enter into a contract with the municipal corporation of a township or with a municipal corporation of two or more townships for the supply and distribution of electrical power or energy in a defined area (hereinafter called a rural power district), including a part of such township or parts of each of such townships, and the Commission may, in pursuance of such contract, construct and operate all works necessary for the transmission of electrical power or energy to the rural power district and for the transforming and distributing of such electrical power or energy to the premises of the persons within the rural power district as so defined or as enlarged or altered from time to time by the Commission, with the approval of the Lieutenant-Governor in Council and the municipal council of councils;

30f. The council of the township or the council of each of such townships party to such contract, may pass a by-law for entering into such contract and may execute the same, and it shall not be necessary to submit any such by-law to the vote of the electors or to comply with any of the other forms required in the case of a by-law passed under Part 1 of this Act; By-law.

*30g. (1) The Commission shall annually fix, adjust and apportion the cost of all the works mentioned in section 30e to be borne by each of the municipal corporations entering into such contract; Apportion-
ment of cost
of annual
adjustment.*

(2) The total amount for which each of the corporations shall be liable shall include a sum sufficient to provide annually the corporation's proportionate cost of the capital cost of the work so as to form in thirty years a sinking fund for the payment of the amount expended by the Commission on capital account for the acquisition or construction of the works necessary for transmitting, transforming, distributing and delivering electrical power or energy in a rural power district, and a further sum sufficient to pay the Commission interest upon the proportionate part of such expenditure to be borne by the corporation, and a further sum to pay the corporation's proportionate part of the line loss and the costs of operating, maintaining, renewing and insuring of such works and of the other charges set out in section 23.

30h. The rates to be charged to customers receiving electrical Rates. power or energy from the Commission in a rural power district shall be fixed by the Commission from time to time, and shall be sufficient to provide the sum necessary to pay all the charges to be borne by the corporation under section 30g.

Application of
Part 1.

30*i*. All of the provisions of Part 1 as to the annual payments to be made by the corporations which have entered into contracts with the Commission shall apply to a contract entered into under this Part.

Collection
of rates.

30*j*. Where any person receiving a supply of electrical power or energy in a rural power district is in default of payment of any account due in respect of such supply, the Commission may notify the corporation of the municipality in which the premises of the person so in default are situate, stating the amount due and such amount shall thereupon be entered upon the collectors' roll of the municipality and collected in the same manner as other taxes.

Surveys have been made in different parts of the Province from which petitions have been received; so that on receiving other petitions the Commission will be in a position to submit at once a rate with the full knowledge of the existing conditions and the possibilities of extensions to the area adjacent to that from which the petition is received. With this information, it will be possible for the Commission to submit rates in districts on the basis of a uniform service charge and a consumption rate for all service which is given from each distribution centre. Below is a list of townships in which surveys have been made, on the different systems:

NIAGARA SYSTEM

Ancaster Township.	Saltfleet Township.
Barton "	Stamford "
Beverley "	Thorold "
Blandford "	Dorchester " North.
Blanshard "	Downie "
Brantford "	Flamboro " East and West.
Burford "	Grantham "
Crowland "	Louth "
Niagara "	Nelson "
Nissouri E. "	Townsend "
Oakland "	Trafalgar "
Oxford "	Waterloo "
Pelham "	Zorra East "

EUGENIA SYSTEM

Derby Township.	Normanby Township, in part.
Amaranth "	Egremont " " "
Howick "	Collingwood " " "
Artemesia Township, in part.	Osprey " " "
Proton " " "	

WASDELL'S SYSTEM

Brock Township.	Scugog Township.
Eldon "	Georgina Township, in part.
Mariposa "	Uxbridge " " "
Reach "	West
Scott "	Gwillimbury " " "

SEVERN SYSTEM

Innisfil Township.	Floss Township, in part.
Tecumseth "	Nottawasaga Township, in part.
West Gwillimbury "	Tay " " "

CENTRAL ONTARIO

East Whitby Township, in part.	Cramahe Township, in part.
West Whitby " " "	Brighton " " "
Darlington " " "	Hallowell " " "
Hamilton " " "	

ST. LAWRENCE SYSTEM

Lancaster Township, in part.	Finch Township, in part.
Charlottenburg " " "	Winchester " " "
Lochiel " " "	Mountain " " "
Kenyon " " "	Williamsburg " " "
S. Plantaganet " " "	Matilda " " "
Cambridge " " "	Augusta " " "
Roxborough " " "	Edwardsburg " " "
Osnabruck " " "	Elizabethtown " " "
Cornwall " " "	Yonge " " "

RIDEAU SYSTEM

Wolford Township.	Lanark Township.
Oxford "	Drummond "

OTTAWA SYSTEM

Nepean Township.	Gloucester Township, in part.
Coulbourne Township, in part.	

ELECTRIC RAILWAY WORK**PROPOSED NEW RAILWAY LINES**

During the year final surveys have been completed and revised estimates prepared for the construction of some 122 miles of new lines. It was the intention that together with certain existing lines or portion of lines to be acquired these should form parts of three main railway divisions—The Toronto Eastern from Toronto to Bowmanville, The Toronto-Niagara from Toronto to some point on the Niagara Frontier, and the Wentworth-Waterloo from Hamilton to Galt with connections to Guelph, Elmira and the principal towns and cities in Wentworth and Waterloo Counties.

The proposed new mileage, as distinct from that of existing trackage to be acquired, distributed under these divisions was:

Toronto-Niagara	63.36 route miles
Toronto-Eastern	24.38 " "
Wentworth-Waterloo	34.56 " "

The survey work involved the examination of a number of alternative routes before the final location plans could be prepared. These were then completed and copies filed with the various municipalities through which the lines passed. The collection and compilation of data covering the lines, through Toronto and Hamilton in particular, required a great deal of preliminary field and office work. In the case of the Toronto-Niagara Division portions of the right-of-way between Toronto and Oakville essential to the scheme were acquired. Previous to January 1, 1920, by-laws approving the construction of that portion of the Toronto-Niagara Division between Port Credit Junction and St. Catharines had been ratified by all the municipalities affected, with one exception. These municipalities later deposited debentures to the amount of the cost of the work as originally estimated with the Commission whose own bonds for a like amount were subsequently guaranteed by the Government. The portion of the line between Toronto and Port Credit Junction had previously been voted on as a part of the original Toronto-London scheme.

For the Toronto Eastern all the interested municipalities which had not done so previously have during the past year passed by-laws endorsing the acquisition of the existing line and its extension through to Toronto.

In the case of the Wentworth-Waterloo Division similar by-laws were submitted to 14 out of 17 municipalities on January 1, 1920, and carried by 13 of these.

In addition to the preliminary and location surveys undertaken in connection with the above, on the Toronto-Niagara and Toronto Eastern Divisions progress was made with the necessary land surveys preparatory to securing a through right-of-way.

Other survey work included a location from London to Brantford, a connection to the Wentworth-Waterloo Division between Dundas and Galt, and in anticipation of the acquisition of the Metropolitan Division of the York Radial, the running of certain lines with a view to establishing physical connection between this and the proposed terminal near the foot of Yonge street.

EXISTING LINES OWNED OR TO BE ACQUIRED

Toronto-Niagara Division

The only portion of an existing line which it is at present contemplated to utilize as a portion of this division is that part of the Hamilton Electric Radial Railway extending from Oakville to the east limits of Burlington. Sufficient information as to this was secured to compute its reproduction cost.

Toronto Eastern Division

Since the survey made last year of the constructed portion of this line, the property has still further depreciated, and owing to this, and to the general rise in costs a new computation had to be made in connection with the revised Toronto-Bowmanville estimates of the amount necessary to put the property into operating condition.

Wentworth-Waterloo Division

A traverse of the G.T.R. between Guelph and Galt was made early in the spring and from this was estimated the cost of its reproduction and electrification. A similar estimate which had previously been made for the branch of the same system between Galt and Elmira was revised so as to bring both valuations to the same basis.

Guelph Radial Railway

Early in the year the City of Guelph, which owns the street railway operating within the city limits, submitted a by-law to the electors embodying a proposition having in view the purchase and operation of the property by this Commission; the intention being that in addition to the ordinary street railway business it should serve as a terminus for the Guelph branch of the Wentworth-Waterloo Division and a link between it and any future Hydro-Electric Railway connection with Toronto.

The result of the vote was favourable to the scheme and arrangements were being made to install such renewals and betterments as were urgently required as soon as an Order in Council should authorize the necessary agreement with the city, but were abandoned on this being withheld by the Government.

M. C. R. and G. T. R. Bridges, Chippawa and Montrose

In accordance with plans prepared by the Department and approved by the Michigan Central Railroad Company last year the old swing bridge carrying that company's tracks across the Welland River, which had been moved upstream on to a temporary diversion, was replaced in its original position and connected up with new approach spans at either end, the whole being supported on concrete piers and abutments which had been constructed in the interim.

For the superstructure of the same company's crossing of the canal at Montrose a contract was let to the Canadian Bridge Company on January 6th, 1920. By October 20th all the material had been fabricated and was being shipped to the site. In the meantime, the company's tracks had been diverted on to a timber trestle in accordance with an agreement entered into after somewhat prolonged negotiations.

Combined M.C.R.-G.T.R. Arch near Niagara Falls

The placing of concrete in this structure, which had been suspended by mutual consent of the contracting parties during the cold weather, was resumed later in the season after the false work for the arches had been erected. The work is rapidly nearing completion. Several minor changes in design and in the method of carrying out the work were adopted after discussion with representatives of the two interested railway companies.

Chippawa Highway Bridge

Owing to unpreceded conditions in the structural steel market, combined with shortage of cars and railway strikes, the Hamilton Bridge Company, which had been awarded the contract for the fabrication and erection of this bridge, was granted an extension of time in which to complete the work. The

pouring of the concrete for the substructure was finished by the end of June, but the removal of steel piling and back-filling was not hurried. Practically all of the steel for both approach and bascule spans has been fabricated.

RELATIONS WITH OTHER PUBLIC BODIES AND PRIVATE COMPANIES

During the year a large number of public utility agreements were executed. In some cases a letter of consent was sufficient authority to proceed with the matter under consideration; in others an order of the Ontario or Dominion Railway Board was first required. The figures for the Board orders given below include all those which affected operations of the Commission directly or indirectly during the year.

Statement of Agreements, Orders in Council, Board Orders, etc., Negotiated.

Item	Previously Negotiated	1920	Total
Wire crossings	1,687	125	1,812
Undercrossings	33	8	41
Miscellaneous agreements	77	63	140
B.R.C. orders	66	109	175
O.R.B. orders	6	30	36
Electric Power Co. agreements	229	—	229
Ontario Power Co. agreements	21	2	23
Total	2,119	337	2,456

LAND SURVEYS

A large amount of work has been undertaken since the date of the last report in connection with surveys, plans and records of land or rights purchased or of which the purchase is contemplated by the Commission.

The procedure adopted has been first of all to make the necessary surveys. This frequently involves a search in land titles or registry office for documents bearing on the property under consideration. From the data so collected a plan is prepared to be used in obtaining an option or completing a purchase. An index card is then made out and filed. This contains all the necessary information regarding that particular property. In the case of a continuous right-of-way or large block of land made up of a number of smaller parcels purchased from different owners, a title record plan is prepared showing each of the latter in its relation to the whole.

In addition to the above a series of title record books has been commenced. In these books all deeds of the Commission, together with attached plans, are copied. The information in the deeds is typed on printed forms. These forms have a heading for every detail, such as "Grantor," "Purchase Price," "Surveyor's Description of Land," etc. The Commission now has about 1,600 deeds of land and this record will make such information very easy of access.

The following summary statement shows the work accomplished during the year, by the Land Surveys Branch:

Power Transmission Line, miles surveyed and mapped..	3
Power Transmission Line, miles mapped only	38
Power Canal, Power and Substation Sites, acres surveyed and mapped	441
Railways, miles surveyed and mapped	60
Deed Index Cards recorded	100
Other Index Cards recorded	1,022
Deeds entered in Record Books	313

Toronto Suburban Railway

A valuation of this property, segregating the portions which might be operated as part of the Toronto Street Railway System, was made as a check on the sale price approved by the Dominion Government. A survey and estimate were also made for a connection between the Guelph branch near Lambton and the proposed main line of the Toronto-Niagara Division via the old Belt Line of the G.T.R.

Niagara, St. Catharines and Toronto Railway

An option on this line, in addition to those on the Toronto Eastern and Toronto Suburban Railways was obtained from the Dominion Government in June, and, as in the case of these latter, a check on the purchase price was made by valuating the physical assets. The estimated cost of an independent line between St. Catharines and Niagara Falls was also made, using as a basis a location run in the autumn of 1919.

Peterboro Street Railway

In order to conform with certain street improvements contemplated by the City Council, and at the same time to renew some of the original track which had fallen into disrepair and become obsolete, the Commission during the past season had the old 56-pound rails removed from George street for a distance of 2,340 feet and replaced with new 85-pound steel on a concrete foundation with pavement of the same material for the width of the roadbed.

Essex Division

In accordance with the by-law passed by the interested municipalities in December, 1919, the Sandwich, Windsor and Amherstburg and Tecumseh lines of the Detroit United Railways were taken over by the Commission on April 1st of this year and have since been operated by it as the Essex Division of the Hydro-Electric Railways. During the succeeding seven months some much needed betterments were proceeded with. These included increasing and rehabilitating equipment, double tracking 3,500 feet on London street from Ouellette to Elm street, installing new "Y" at the Ford Plant and renewing turnouts and intersection at corner of London and Ouellette streets. Studies were also made for a proposed down town loop in order to relieve present congestion and improve operating conditions. An estimate has been prepared for a new Belt Line in Walkerville and Windsor, which it is expected to construct in 1921. Numerous betterments to equipment and roadbed are expected to be undertaken in the near future that will materially improve the service on these lines.

INFORMATION REQUESTED BY RADIAL RAILWAY COMMISSION

The Commission which had been appointed by the Ontario Government under Order in Council dated July 21, 1920, to investigate and report on the Hydro-Electric Power Commission's proposed railway programme requested, at its first and subsequent sittings, the production of a large mass of information which had either not been prepared or was not in shape for presentation. The compilation of the necessary maps, profiles, estimates and statements in the form requested, occupied the time of the Railway Department staff for many weeks, during which time, however, the prosecution of the Commission's original programme was suspended.

QUEENSTON-CHIPPAWA DEVELOPMENT**Alterations to International Railway and Queenston Power House Spur Lines**

Negotiations with all the interested parties having been satisfactorily concluded and the necessary right-of-way purchased, work on the diversion of the International Railway at Queenston and the spurs from it to the Michigan Central Railway and new Power House site was vigorously pressed during the winter so that early in the season cars were running over the new route and direct connection had been secured between the steam line and the track along the foot of the escarpment.

An agreement covering a temporary and also a permanent diversion of the International Railway Company's track near Smeaton's curve was also concluded and the necessary work carried out during the winter by the Commission's forces.

LABORATORIES DEPARTMENT

The functions of this department have been fully explained in previous reports. No extension has been made during the present year to these functions, but a considerable increase in the volume of testing and investigation has taken place during the past year.

Among the points specifically mentioned in the reports of the various sections below, the following are worthy of special attention:

The large increase in commercial work carried on by this department for parties outside the Commission. This work has included efficiency tests on motors, generators, etc., repairs to and calibration of meters of all kinds, precise electrical measurements of conductivity, etc.

The larger number of field tests made by the Laboratory staff for the Engineering Department. These tests were chiefly electrical, but several tests involving thermodynamic and hydraulic equipment were made.

The extension of the inspection work to engineering materials, such as line hardware, steel for power-house structures, penstocks, etc.

The application of laboratory methods to concrete inspection in the field.

The testing of automobile headlight lenses for the Provincial Government.

Comparatively few additions have been made to the equipment during the year. The most important item added was a Corona voltmeter designed to measure voltages as high as 300,000. This device is intended to replace the sphere-gaps and needle-gaps for the measurement of high voltages, as these devices have been

found to be not entirely satisfactory for this purpose. This piece of equipment is now practically completed and the preliminary tests indicate that it will be entirely satisfactory and will be a valuable addition to the testing equipment.

The work of the various sections is described more fully below.

High Tension and General Testing Laboratory

Previous reports have outlined the general activities of this laboratory and have listed various items of equipment which are essential to its work, hence it is not necessary to enumerate the various items in detail nor to recount the routine tests which have become standard practice.

In a general way we may say that this laboratory is prepared to undertake practical electrical tests, studies or investigations of almost any range. Tests which have become standard practice are systematized and treated as routine for economy of operation as well as for proper comparison of results. Frequently, however, special tests are required to clear up some doubtful phenomena and the final results are usually of sufficient importance to be dignified by the name of an investigation.

Routine electrical tests are made on many classes of apparatus and materials. The various commercial tests are made on constant-potential and constant-current transformers, alternating and direct-current generators and motors along the lines mentioned in previous reports with the added advantage of equipment especially suited for this class of work. The testing of oil for dielectric strength is a routine test, important not only because all the high tension transformers and oil-breakers are thus looked after, but also because approximately seventy samples per month are received from various municipal stations. High tension insulator investigation is also an important routine test, though its development and the various methods of line construction warrants its mention as a special line of investigation also. Apparatus is available from which any single-phase voltage up to 200,000 volts at 25 cycles or 400,000 volts at 60 cycles may be obtained and a great deal of work is done at 110,000 volts and higher.

The monthly testing and inspection of linemen's rubber gloves has become standard practice as outlined by the Committee on Accident Prevention. These tests are made to ensure the safety of linemen and others when it is found necessary to work on line apparatus and a record is kept of the life history of each glove used for this purpose.

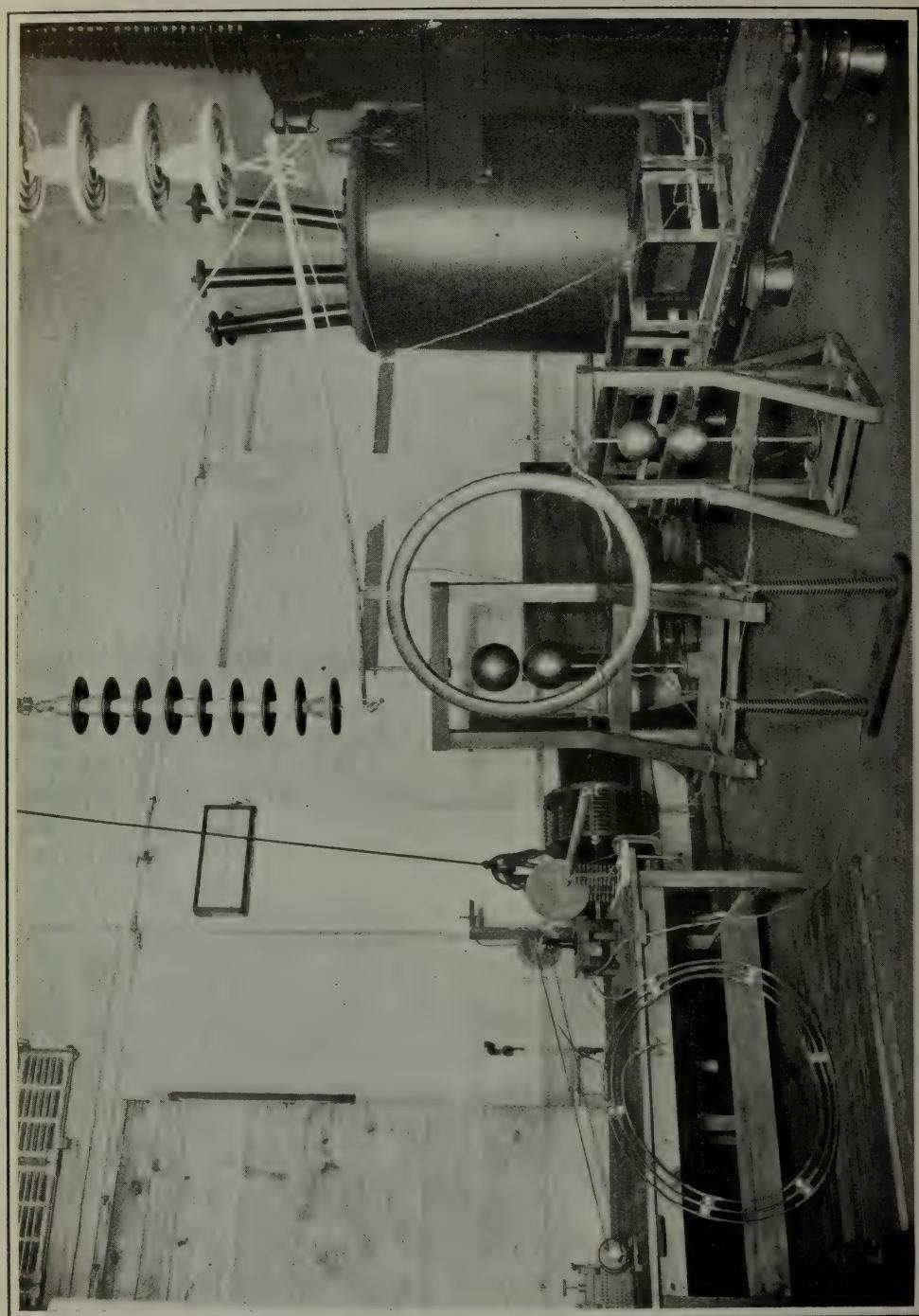
Among the various classes of work done in a regular way are—the measurement of load distribution in mills and factories, checking the suitability of application of special electrical apparatus to various uses, inspection and testing of electrical equipment required by the Construction Department, testing for manufacturers with a view to improvement in certain lines of their product.

Special problems have been studied, suitable tests made and reported on during the year among which are the following:—

The testing of cutouts for distribution transformers with a view to the selection or development of the best possible equipment for the purpose.

The analysis and compilation of test and theoretical data on the subject of interference between power lines and communication circuits.

The study of the operating characteristics of equipment for new developments to eliminate the possibility of trouble from any cause.



High Frequency test on a Transformer Coil in the High Tension Laboratory.

The development of a method and the testing of insulation in certain pieces of equipment by high voltage and high frequency. These tests required that much more energy be available at the given frequency and voltage than the capacity of the more common apparatus will supply.

Progress in the development of test methods for insulators in situ, for current transformers in situ, and analysis of the accuracy of the methods.

Inspection, test and analysis of faults in equipment with determination of the limitations under which it should operate. Typical subjects covered include storage batteries, current transformers, protective relays.

Current carrying capacity of transmission line conductors as affected by various atmospheric conditions, e.g., wind blowing, rain, etc.

Special tests on the physical properties of switch and transformer oils.

Line and load calculations on systems for the purpose of efficient location of substations and transformers.

Tests on the natural period of vibration of bus-bars to improve the safety-factor of bus construction.

The checking of theoretical studies by tests on the forces acting between bus-bars and bends in the same for the purpose of fixing the rules of design in station construction.

Assistance in the tests for overall efficiency of complete units, hydraulic and electrical, in generating stations. This work, systematically and regularly carried out, will give accurate information on the depreciation occurring in various parts of the equipment.

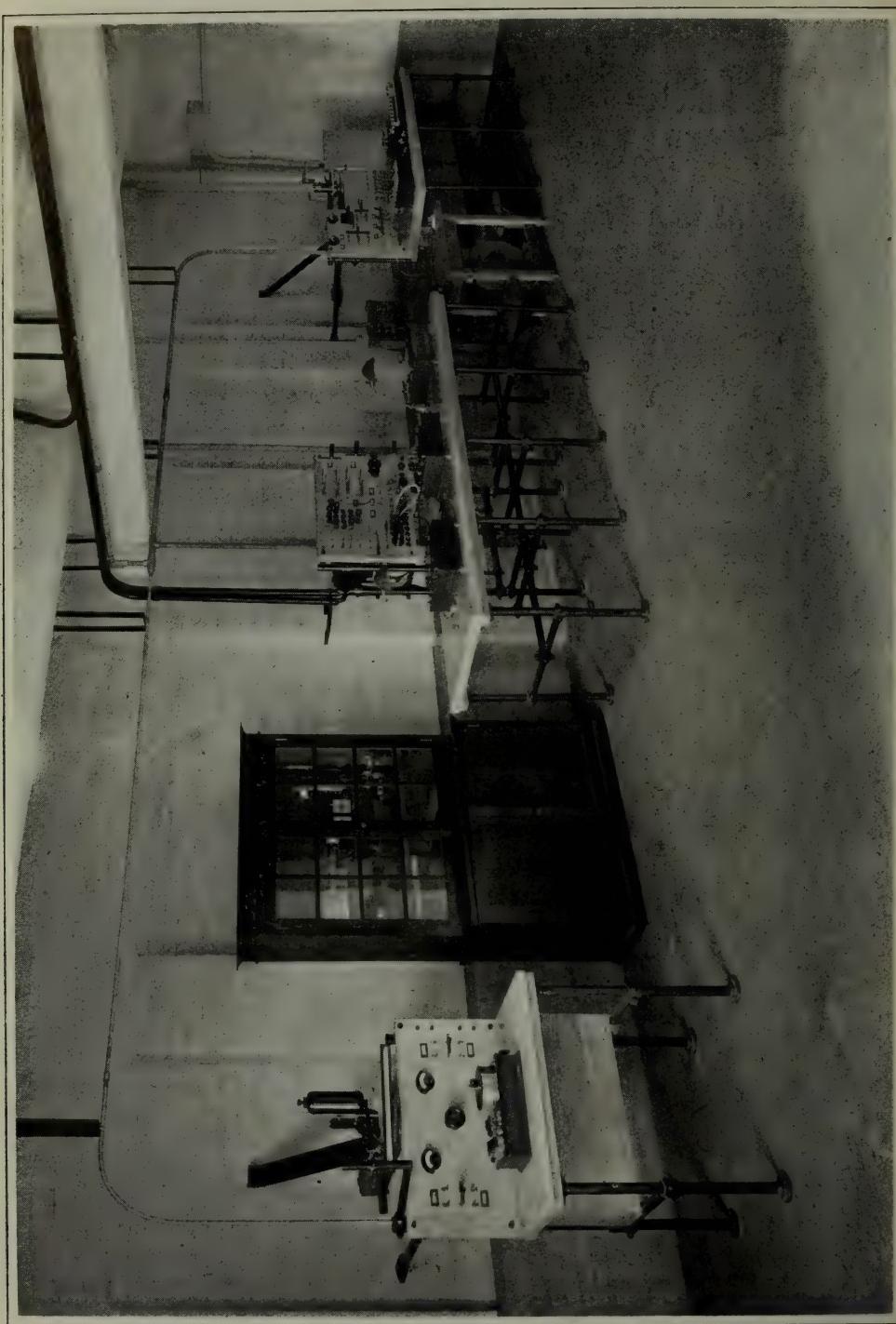
The construction of a Corona volt-meter of 300,000-volt rating to aid in the study of high tension line properties and phenomena.

This laboratory acts in a liaison capacity as far as possible between the fields of the so-called pure and applied sciences such as are required by the various activities of the Commission. The result of such a position is to throw much light on the problems of advanced engineering practice.

Approval Laboratory

The chief new development in the work of the approval section of the laboratories during the past year has been the increased interest in the work of the laboratory and the Approval Committee by other inspection authorities. The Underwriters' Laboratories have agreed to co-operate with the Commission in the maintenance of the standards and the elimination of fire and accident hazards, and have placed at our disposal their facilities in Chicago and New York for making tests requiring equipment which we are at present unable to secure in the Toronto Laboratories. We have already accepted this offer, and will shortly undertake a series of short-circuit tests on enclosed cartridge and plug fuses at the West Side battery station in Chicago. At the present time there is not available in Toronto a suitable storage battery of this large capacity—10,000 amperes at 600 volts.

The installation of two 160 ampere 250-volt resistance loads arranged to be operated in 1/2 ampere steps, which are now on order and whose delivery is expected at an early date, will provide means of making service tests on switches of the larger types up to 200 amperes at 250 volts, or 100 amperes at 500 volts. These tests are usually made with direct current, and it is proposed to use these resistance loads at one of the substations in the downtown section of the city, where such d. c. supply can readily be obtained.



Electrical Standards Room, showing Standard Instruments in place

As a measure of safety in making the routine insulation tests at voltages up to 4,000 V., a testing cabinet has been constructed and will shortly be equipped with automatic doors, so that the operator will not come into contact with the high voltage leads. At the present time rubber gloves are used, but the automatic switch cutting off all power to the cabinet with opening of the door is considered the more desirable.

The specification for electric washing machines has been completed and will be put into effect December 1st, 1920. Regulations have also been issued in the form of Laboratory Bulletins covering approval of switch plates, electric signs, stage lightning fixtures, cutout boxes and special metal enclosures, during the past year. Other specifications are also nearing completion, and, it is hoped, will be ready for distribution in the near future.

In this connection it might be mentioned that the laboratory engineers have been co-operating with the Canadian Engineering Standards Association in the matter of gathering opinions regarding the proposal to issue a Canadian National Electrical Code.

At the present time English manufacturers claim that they are at a disadvantage as compared with American manufacturers in Canadian markets, and they are, therefore, agitating for modifications of the present standards, or at least an opportunity to submit their goods for consideration to a Canadian rather than an American laboratory for inspection and approval. Several manufacturers, through the British Trade Commissioner, have therefore submitted samples of their goods for our inspection and comment, although none have yet applied definitely for approval. The matter of factory inspection in England will need further consideration before lines such as conduit or wire are approved. A special report, however, is being made on British-made conduit in regard to its suitability for use in this country. Comparisons have been drawn with our standards for conduit and metal raceways, and the report will deal with the types which might prove acceptable for use under our present regulations.

The system of checking all electrical goods, whether approved by other authorities or not, has been continued and enlarged. A large number of manufacturers have already complied with the regulations, and their goods are now listed either on white cards when approved by this laboratory, or on green cards when approved by the Underwriters' laboratories. The number of approval reports completed by the laboratory during the year was 105. The publication of the approval regulation notice in the most important electrical and allied trades papers was undertaken during the months of May and June, while several circular letters were also issued to the trade on this subject.

Chemical Laboratory

The work of the chemical laboratory does not change much from year to year. It increases slowly in both volume and scope, and the service it is rendering to the Commission is being found increasingly valuable.

Special attention has been given during the past year to lubricants and lubrication. Oils have been tested and analyzed, and the tests correlated with the results the same oils are giving in service. Much data has thus been collected, and specifications based on this information are now in preparation.

The chemical laboratory has successfully carried out a number of manufacturing operations for the Commission—2,660 lamps have been frosted; solder-



Equipment used for making tests on Automobile Headlights for the Provincial Government Department of Highways.

ing paste, soft soap and certain office supplies have been made up in quantities. This work could be much increased, but since the primary purpose of the chemical laboratory is research and testing, no serious attempt has been made to develop this field.

Paints have received further attention this past year, and an interesting series of tests on concrete paints for both interior and outdoor service has been carried out. A similar series on iron and steel paints is in preparation.

The chemical laboratory is equipped to make analyses of all classes of materials. It regularly tests cement and cement materials, coal, coke, steel and other metals, rubber, oils, paints, water, special preparations, etc. Its equipment is very complete, and the work can be handled expeditiously.

Structural Materials Laboratory

The routine testing of concrete and concrete materials, cement, sand and stone, has been steadily increasing in volume. Over six hundred cement tests alone have been handled in the last year. The cement laboratory as now equipped can make one hundred tests per week. This capacity is being more than doubled in anticipation of the requirements next summer of the Niagara Power Development.

In last year's report we described the results which had been obtained from certain research work on concrete. This work has been continued throughout the year with satisfactory results.

Further work has been carried out on simplifying the present methods of determining surface area of sands and judging the concrete making properties of concrete materials. A very successful formula for determining under many conditions the proper quantity of water for concrete mixture has been developed experimentally. Studies are being carried out on the "yield" of concrete obtainable from different mixtures of cement aggregate and water, with a view to determining the relative economy of mixtures.

The method of proportioning developed as a result of this investigational work has been used all summer on the Nipigon Development, where approximately 35,000 cubic yds. of concrete have been placed. Our experience there has demonstrated its practicability and success.

Two reports describing some of the results of this investigational work on concrete have been prepared and published as bulletins of the Commission. These are being distributed to those interested.

Inspection of Engineering Materials

This work divides itself into inspection of concrete and concrete materials, inspection of steel and other metals, and shop inspection of structural fabrication.

Cement shipments are regularly inspected and sampled at the cement mills prior to shipment by representatives of the laboratory. This is a part of the regular service of the laboratory for any construction work for which cement tests are made.

Deposits of sand and gravel from which the Commission intends to obtain supplies for concrete are inspected by laboratory engineers, samples taken for test and reports made upon their economic features.

Where the quantities of concrete being placed justify the expense, inspecting engineers from the laboratory are sent out. They become for the time being members of the field organization to which they are assigned. Their duties are to inspect the materials, the processes and plant used, set the proportions, take samples, etc. This arrangement was carried out this summer for the Nipigon Development.

Inspection of steel and steel products comprises mill inspection and testing of samples of materials such as concrete reinforcing bars, rails, pipes, special forgings and castings, etc. A large tonnage of this class of material has been handled in the past year, the principal items of which are 5,000 tons of reinforcing steel and 30,000 feet of pipe.

Shop inspection of the superstructure of the Nipigon powerhouse was completed during the year. Similar inspection was made on a bascule highway bridge and on a number of smaller items, tanks, transformer trucks, steel concrete forms, screen racks, etc. A great deal of this work is in hand for the immediate future.

Field Laboratories

A field laboratory was established at Nipigon during the past summer. This was equipped to make the tests on concretes and aggregates necessary in carrying out the method of proportioning used there. The laboratory proved a great convenience, and the plan is to be extended to other work.

By arrangement with one of the manufacturers of cement a temporary laboratory was installed at one of their mills, which was too far from Toronto for the work there to be handled expeditiously from here. The inspection and testing of approximately 20,000 barrels of cement was handled through this laboratory.

Meter and Standards Laboratory

The operations of this section during the past year have continued along much the same lines as in previous years. No great changes have been made in the layout or construction of the equipment. It has been found possible to get many of the tests down to a more or less routine basis, thus enabling great savings of time to be accomplished. Much standardization of instruments has been done, both on laboratory meters and apparatus brought in by outside parties. The standardization work has also been so co-ordinated with the repair, that damaged instruments can receive attention and be prepared for calibration without delay. There has been a noticeable increase in the number of indicating instruments being sent in for repair or calibration by outside parties, these including municipalities, private concerns and manufacturing corporations.

For some years there has been under way a detailed investigation of demand meters, with the object of determining the true status of the various types of devices of this class as sources of valuable information in the measurement of actual industrial and commercial loads. This investigation has been completed, and a very full report of the work prepared. The conclusions of this report would tend to show that the demand meter, though it cannot be considered as a precision instrument, is capable of giving very valuable information in a simple form. Different types of demand meters are likely to put differing interpretations upon similar load conditions; and, considering the number of uncontrollable variables which enter into the measurement, it is unnecessary to lay great stress upon the time period used.

A considerable number of oscillograph investigations have been made. Some very valuable tests were made upon a new generator being put into service in one of the power houses, showing operation under various short-circuit conditions, and demonstrating the action of the automatic voltage regulators. In connection with an extensive series of tests which were being run on transformer primary cut-outs, a large number of oscillograms were made, and show the operating characteristics of the different types tested. It has been possible also to co-operate with engineers who were carrying out investigations of the possibilities of high frequency telephony in connection with power systems, and, by means of the oscillograph, to gain some very interesting information.

A number of tests requiring special methods of measurement have been made during the year. Among these may be mentioned: Measurement of the inductance of transformer coils; dielectric strength of fire extinguisher fluids; magnetic characteristics of telephone transformers at low flux densities.

Tests have been carried out on various new types of apparatus which the Commission has contemplated using at its stations or elsewhere. Among these are graphic meters, demand indicators, temperature recorders and general testing apparatus. A complete re-design has been accomplished upon an electrostatic voltmeter used in the laboratories, making it much more flexible and generally increasing its sphere of usefulness.

The revision of the specification of acceptance tests for watt-hour meters has been carried out, and is now practically complete. In this connection there have also been drawn up a series of specifications for the purchase of watt-hour meters, which are intended to apply to the purchase by the Commission of apparatus of this class. The testing of street lighting relays built by another Department has been carried out systematically, so that an assurance is obtained that these are up to specification before they are taken into stock. It has been found possible to co-operate with the Stores Department in the examination, repair and modification for special work of watt-hour meters carried in stock.

The systematic repair and readjustment of watt-hour meters for small municipalities has been carried on; and though this work showed a decided slump during the period of power shortage, a noticeable revival is now in evidence. Much of the Dominion Government inspection of watt-hour meters for the Toronto district is carried on in this Department by the Inspectors of the Department of Weights and Measures, who visit the laboratories when shipments of meters are ready to go out, and test them on the boards in the meter shop, thus avoiding the duplication of time and energy. In several cases it has been found feasible to send a member of the staff to a municipality to proceed with the adjustment of old meters for re-verification by the Inspectors.

Much routine work has been done upon commercial metering devices, including demand meters, graphic instruments, switchboard meters, insulation testing sets, rail bond testers, instrument transformers and portable meters. This work includes re-winding, repairing, cleaning, adjusting and general overhauling.

The work of the instrument shop, under the jurisdiction of this section, has continued to be of great value to the laboratories. A number of special testing devices for various departments have been constructed, and it has been possible to keep in good condition such pieces of apparatus as are subject to deterioration in use or to accident.

Photometric Laboratory

During the past year the regular work of this section of the laboratories has been carried on as in former years, and in addition some unusual tests have been completed that serve as an indication of the scope of the work and the variety of testing that the laboratory is prepared to undertake.

The routine tests of lamps include examination of the lamps for mechanical defects, tests for physical and electrical defects, measurement of initial rating and life performance. As in former years, a good proportion of these tests have been of a commercial nature for parties outside the Commission. Tests of lamps for special purposes have been made, such as low voltage and train-lighting lamps. It was found necessary to install an extension to the rack for life-testing series lamps.

Tests were made of motion picture projectors with specially designed gas-filled tungsten lamps and optical equipment. These tests included the projection of pictures and measurements of screen illumination and the angular distribution of brightness of plain cotton and metallic-coated screens. These tests showed that the tungsten lamps produced very superior results to the commonly used arc lamps on alternating current and at a very great saving in current. The results of these tests are important to the smaller municipalities, as they show that a motion picture theatre can be profitably operated with tungsten lamp projection where the arc would be a considerable proportion of the town load, resulting in an excessively high rate.

This department co-operated with representatives of the Provincial Government in deciding upon the limits to be placed upon the use of automobile headlights in the Province. The necessary apparatus for making the tests of headlight devices was designed in the department, and the testing of such devices has become part of the regular work of the laboratory. One hundred and ninety-five complete tests of headlight devices have been made, as well as many supplementary tests on details requiring special attention. For this work the necessary standard lamps used in the head-lamps were standardized and maintained in the laboratory.

This section is also co-operating with the Physics Department of the University of Toronto in research work on gas-filled lamps.

An increased number of distribution tests of lighting units have been made. Some illumination measurements were made of competitive samples of train-lighting glassware.

Some work was done in connection with the drafting of lamp specifications as proposed by the Sub-Committee on Lamp Specifications of the Canadian Engineering Standards Association.

The department has co-operated with other departments of the Commission on various illumination problems.

A photometric device was constructed for measuring the diffusing characteristics of transmitting media, such as opal and frosted lamp bulbs and globes, as well as sheet glass.

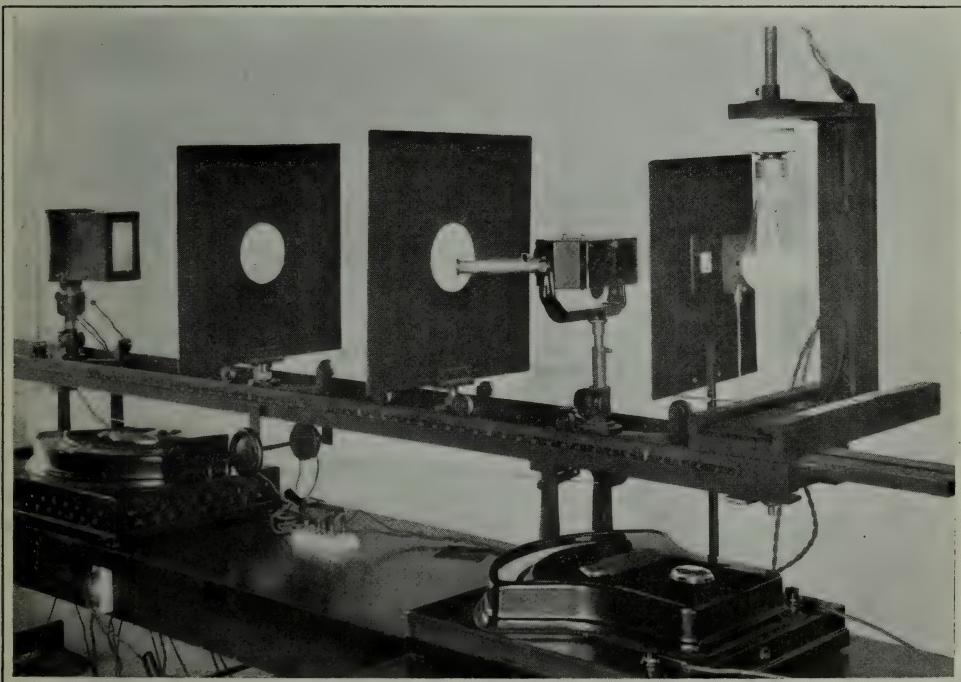
A few changes have been made to the photometers to facilitate the rapid handling of lamps and the lessening of the clerical work necessary in compiling the test results.

Photographic Section

This section has been kept pretty busy during the past year, during which time over 14,000 prints have been made from blue prints and other copies sent in from negatives in the laboratory, and from pictures taken in the field by the Engineering Staff and by the Photographic Staff. Lantern slides to the number of 271 were made, and 20 enlargements.

Trips were made to the Big Chute, High Falls, Healey Falls, Ranney's Falls, Eugenia and Nipigon Generating Stations, and monthly trips to Niagara Falls, where progress pictures were made of the Ontario Power Co.'s pipe line No. 3, and work on the Chippawa-Queenton Canal and power-house excavations.

During 1919 a blue printing department was added, with 1 mercury vapor printing machine and an electric drier, which started operation on October 27th, and handled 1,717 orders for vandyke negatives, white and blue line prints on paper and linen, and blue prints from 1 to 500 on a single order.



Measuring the diffusion of light from a Frosted Lamp—Photometric Laboratory.

LIBRARY

The Library was started in 1916 to meet a need that began to become pressing at that time, namely, the proper classification and care of the various technical papers, periodicals, books, reports, etc., having a more or less permanent value, but which could no longer be taken care of adequately under the general filing system.

At the present time there are some 2,700 volumes in the Library, covering a wide range of subjects of direct interest to the various departments of the Commission, amongst them many important Government reports, pamphlets, etc., all of which are classified under the Dewey Decimal System.

There are some seventy periodicals subscribed for through the Library, and routed to the various departments interested, after which they are returned and ultimately bound in annual volumes.

The expenditure for the past year on books, periodicals, binding reports, etc., amounted to approximately \$1,125, which includes a number of books on permanent loan to departments exclusively interested in them.

It is on record that books have been borrowed 4,300 times since the latter part of 1917, not to mention casual references of which no record is kept. This, together with the undoubted service in handling periodicals, goes to show that the Library is performing in a useful manner the functions for which it was intended.

This is even further evidenced by its healthy growth from a mere heterogeneous collection of books and pamphlets in 1916 to the well organized library of 2,700 odd volumes that it is now.

This growth, in keeping as it is with that of the Commission's activities as a whole, will necessitate before long the provision of room for expansion, which should be taken into account in any comprehensive plans which may be considered for increasing the accommodation of the Administrative Office Staff.

Table No. 1
CAPACITIES OF TRANSFORMERS INSTALLED OR ORDERED FOR COMMISSION'S STATIONS

Total Capacity 849,445 Kv-a.

The following list includes spares, but does not include Station Service Transformers

Station	Voltage	Transformers Installed		Transformers on Order		Total Station Kv-a.	System Capacity Kv-a.
		Mfr.	Kv-a.	Mfr.	Kv-a.		
QUEENSTON-CHIPIAWA DEVELOPMENT.							
(Construction Stations.)	25 Cycles						
Montrose Sub-Station	{ 12,000— 4,000	C.G.E.Co.	3,000	C.C.W.Co.	1,500	.....	.....
	12,000— 440	G.E.Co.	990	M.E.Co.	1,800	.....	7,290
	4,000— 550	.....	4,500	.....	.....	.....	.....
Whirlpool "	{ 12,000— 4,000	C.G.E.Co.	2,400	.....	.....	10,210	17,500
	4,000— 575	M.E.Co.	3,310	.....	.....	.....	.....
	12,000— 440	C.G.E.Co.	.....	.....	.....	.....	.....
Queenston Generating Station	12,000—110,000	.....	.....	C.W.Co.	225,000	225,000	225,000
NIAGARA SYSTEM.							
(1) Niagara Transformer Station	{ 12,000—110,000	C.W.Co.	167,000	.....	.....	202,000	.....
	12,000— 46,000	C.G.E.Co.	35,000	.....	.....	17,500	.....
	110,000— 13,200	C.G.E.Co.	17,500	.....	.....	450	450
(2) Dundas Transformer Station.....	13,200— 2,300	P.T.Co.	450	.....	.....	225	225
Caledonia Dist. Station	13,200— 2,300	C.C.W.Co.	225	.....	.....	225	225
Waterdown " "	13,200— 4,000	C.W.Co.	225	.....	.....	225	225
Hagersville " "	13,200— 4,000	C.W.Co.	225	.....	.....	225	225
Lynden " "	13,200— 4,000	C.W.Co.	225	.....	.....	225	225
(3) Toronto Transformer Station	110,000— 13,200	C.G.E.Co.	75,000	.....	.....	75,000	.....
(4) London Transformer Station.....	110,000— 13,200	C.G.E.Co.	17,500	.....	.....	17,500	.....
Dorchester Dist. Station	13,200— 4,000	C.W.Co.	225	.....	.....	225	225
Lucan " "	13,200— 4,000	C.G.E.Co.	225	.....	.....	225	225
Delaware " "	13,200— 4,000	P.E.Co.	75	.....	.....	75	75
Egeter " "	13,200— 4,000	C.G.E.Co.	300	.....	.....	300	300
Alisa Craig " "	13,200— 4,000	C.W.Co.	225	.....	.....	225	225
(5) Guelph Transformer Station	110,000— 13,200	C.G.E.Co.	5,000	.....	.....	5,000	.....
Action Dist. Station.....	13,200— 2,300	C.W.Co.	225	.....	.....	225	225
Georgetown Dist. Station	13,200— 4,000	C.G.E.Co.	450	.....	.....	450	450
Rockwood " "	13,200— 2,300	C.G.E.Co.	75	.....	.....	75	75
Cheltenham " "	13,200—	C.G.E.Co.	575	.....	.....	225	225

Table No. 1—Continued
CAPACITIES OF TRANSFORMERS INSTALLED OR ORDERED FOR COMMISSION'S STATIONS—Continued
Total Capacity, 849,445 Kv-a.

Station	Voltage	Transformers Installed		Transformers on Order		Total Station Kv-a.	System Capacity Kv-a.
		Mfr.	Kv-a.	Mfr.	Kv-a.		
Fergus Dist. Station “ Elora	13,200— 13,200— 110,000— 110,000—	C.G.E.Co. C.W.Co. C.G.E.Co. C.G.E.Co.	225 225 3,000 2,250	C.G.E.Co. C.P.E.Co. C.C.W.Co. C.G.E.Co.	60 6,750 450 450	60	225 225 5,250
(6) Preston Transformer Station.....	13,200— 13,200— 6,600	C.G.E.Co.	60	C.G.E.Co.	6,750 225 450	10,000	16,750
South Waterloo Twp. Distributing Station	6,600— 4,000	C.G.E.Co.	60	C.G.E.Co.	6,750 225 450	10,000	225
(7) Kitchener Transformer Station.....	110,000 13,200 13,200— 13,200— 13,200— 13,200— 13,200— 110,000— 26,400	C.G.E.Co. P.E.Co. C.C.W.Co. C.G.E.Co. M.E.Co. C.W.Co. C.W.Co. { C.G.E.Co.	6,750 225 450 450 75 5,000 300 600	C.G.E.Co. C.G.E.Co. C.G.E.Co. C.G.E.Co. C.G.E.Co. C.G.E.Co. C.G.E.Co. M.E.Co.	60 10,000 450 450 75 5,000 900	10,000	16,750
New Hamburg Dist. Station.....	2,300	P.E.Co.	225				225
Baden “ “	4,000	C.C.W.Co.	450				450
Elmira “ “	4,000	C.G.E.Co.	450				450
St. Jacobs “ “	575	M.E.Co.	75				75
(8) Stratford Transformer Station.....	110,000— 26,400 26,400— 4,000	C.W.Co. { C.G.E.Co.	5,000 300 600	C.G.E.Co. C.G.E.Co. C.G.E.Co.	5,000 225 225	5,000	5,000
Listowel Dist. Station.....	26,400— 4,000	C.G.E.Co.	300				900
Harriston Dist. Station.....	26,400— 4,000	C.G.E.Co.	600				225
Tavistock “ “	575	C.C.W.Co.	225				225
Milverton “ “	4,000	C.G.E.Co.	225				225
Palmerston “ “	4,000	C.G.E.Co.	225				225
Dublin “ “	4,000	M.E.Co.	50				50
(9) St. Mary's Transformer Station.....	110,000— 13,200 13,200— 575	C.G.E.Co. C.G.E.Co.	3,000 1,500	C.G.E.Co. P.E.Co.	3,000 450	3,000	3,000
St. Mary's Cement Dist. Station.....	13,200— 550	P.E.Co.	450	C.G.E.Co.	450	450	1,950
(10) Woodstock Transformer Station.....	110,000— 13,200 13,200— 2,300	C.G.E.Co. C.G.E.Co.	6,000 225	C.G.E.Co.	6,000 225	6,000	6,000
Beachville Dist. Station.....	13,200— 2,300	P.E.Co.	225				225
Norwich “ “	2,300	P.E.Co.	225				225
Emburo “ “	4,000	P.E.Co.	50				50
(11) St. Thomas Transformer Station.....	110,000— 13,200 13,200— 920	C.G.E.Co. C.W.Co.	5,250 150	C.G.E.Co.	5,250 150	5,250	5,250
Aylmer Dist. Station.....	13,200— 4,000	C.G.E.Co.	150				150
Port Stanley “ “	2,300	S.C.O. of C.	225				225
Dutton “ “	4,000	C.W.Co.	225				225
West Lorne “ “	4,000	C.W.Co.	225				225
(12) Brant Transformer Station.....	110,000— 26,400	C.W.Co.	10,000				10,000

Table No. 1.—Continued.
CAPACITIES OF TRANSFORMERS INSTALLED OR ORDERED FOR COMMISSION'S STATIONS—Continued
Total Capacity 849,445 Kv-a

Station	Voltage	Transformers Installed		Transformers on Order		Total Station Kv-a.	System capacity Kv-a.
		Mfr.	Kv-a.	Mfr.	Kv-a.		
EUGENIA SYSTEM.	60-Cycles						
Eugenia Generating Station.....	4,000—22,000	C.W.Co.	5,400				5,400
Owen Sound Dist. Station.....	22,000—2,300	C.W.Co.	1,650				1,650
Chatsworth “ “	22,000—4,000	C.G.E.Co.	75				75
Chesley “ “	22,000—4,000	C.G.E.Co.	300				300
Durham “ “	22,000—4,000	C.G.E.Co.	150				150
Durham Cement Dist. Station.....	22,000—2,300	C.G.E.Co.	1,200				1,200
Mount Forest “ “	22,000—4,000	C.G.E.Co.	300				300
Sheilburne “ “	22,000—4,000	M.E.Co.	150				150
Grand Valley “ “	23,000—4,000	C.G.E.Co.	150				150
Orangeville “ “	22,000—4,000	M.E.Co.	450				450
Kilsyth “ “	22,000—4,000	M.E.Co.	75				75
Elmwood “ “	22,000—4,000	M.E.Co.	50				50
Hanover No. 1 “ “	22,000—4,000	P.E.Co.	750				750
Priceville “ “	22,000—2,200	P.E.Co.	750				750
Priceville “ “	22,000—2,200	G.E.Co.	*20				20
BRUCE COUNTY SYSTEM.	60-Cycles						10,270
Wingham Dist. Station	22,300—2,300	C.G.E.Co.	*750				750
Holyrood “ “	23,000—2,200	C.W.Co.	*300				300
Teeswater “ “	22,000—2,200	C.G.E.Co.	*150				150
Kincardine “ “	22,000—2,200	C.W.Co.	*375				375
SEVERN SYSTEM.	60-Cycles						1,575
Big Chute Generating Station	2,200—22,000	C.W.Co.	{ 3,600				4,200
Penetanguishene Dist. Station	22,000—2,200	C.C.W.Co.	600				600
Barrie “ “	22,000—2,300	C.G.E.Co.	700				700
Collingwood Dist. Station	22,000—2,300	C.G.E.Co.	1,200				1,200
Coldwater “ “	22,000—2,300	M.E.Co.	50				50
Elmvale “ “	22,000—2,300	C.W.Co.	225				225
Stayner “ “	22,000—4,000	C.W.Co.	300				300
Port McNicoll Dist. Station	22,000—2,300	C.G.E.Co.	50				50
C.P.R. Pt. McNicoll Dist. Station.....	22,000—575	C.G.E.Co.	1,500				1,500

Wanbaushene Dist. Station	22,000—	2,300	C.G.E.Co.	50
Midland " "	22,000—	2,300	M.E.Co.	900
Alliston " "	22,000—	4,000	Packard Co.	225
Beeton " "	22,000—	4,000	M.E.Co.	75
Thornton " "	22,000—	4,000	M.E.Co.	25
Tottenham " "	22,000—	4,000	M.E.Co.	75
Cookstown " "	22,000—	4,000	M.E.Co.	75
Bradford " "	22,000—	4,000	C.G.E.Co.	75
	22,000—	575	M.E.Co.	300
		45	C.G.E.Co.	345
				10,715
WASDELL'S SYSTEM.				
Wasdell's Falls Generating Station	60-Cycles 2,300—	22,000	C.W.Co.	1,050
Beaverton Dist. Station	22,000—	4,000	C.W.Co.	300
Cannington " "	22,000—	4,000	C.W.Co.	300
Kirkfield Crushed Stone Distributing Station	22,000—	4,000	P.E.Co.	225
	4,000—	550	M.E.Co.	30
				255
				1,905
ST. LAWRENCE SYSTEM.				
Cornwall Transformer Station	110,000—	26,400	C.G.E.Co.	5,000
Prescott Dist. Station	26,400—	2,300	C.G.E.Co.	450
Winchester " "	26,400—	2,300	C.G.E.Co.	150
Chesterville " "	26,400—	4,000	C.G.E.Co.	300
Cornwall Toronto Paper Co., Dist. Station	26,400—	600	C.G.E.Co.	750
Brockville Distributing Station	26,400—	2,300	C.G.E.Co.	1,500
Williamsburgh " "	44,000—	2,400	M.E.Co.	50
Apple Hill " "	44,000—	4,160	P.E.Co.	300
Alexandria " "	44,000—	4,160	P.E.Co.	300
				300
				10,300
CENTRAL ONTARIO SYSTEM.				
Generating Stations—				
Fenelon Falls	2,400—	44,000	C.G.E.Co.	750
	600—	11,000	C.G.E.Co.	945
Auburn	6,600—	44,000	C.G.E.Co.	3,750
Healey Falls	2,400—	6,600	C.G.E.Co.	600
Stephens Dam	6,600—	44,000	C.W.Co.	11,250
Sidney No. 2	2,400—	44,000	C.W.Co.	4,500
	6,600—	44,000	C.W.Co.	9,000
				9,000
Sub-Stations—				
Northumberland Pulp Mill	44,000—	2,400	C.W.Co.	2,250
Delora	44,000—	600	C.W.Co.	750
Madoc	44,000—	4,160	C.G.E.Co.	900
				2,250
				750
				960
				30,795

*Being transferred to this station—not yet in service.

Table No. 1—Continued

CAPACITIES OF TRANSFORMERS INSTALLED OR ORDERED FOR COMMISSION'S STATIONS—Continued

Total Capacity, 849,445 Kv-a.

Station	Voltage	Transformers Installed		Transformers on Order		System Capacity Kv-a.
		Mfr.	Kv-a.	Mfr.	Kv-a.	
Sulphide	44,000— 4,160	C.C.W. Co.	480	.....	.....	1,230
Lehigh Cement	44,000— 600	C.G.E. Co.	750	.....	.....	3,000
Point Anne Quarries	44,000— 600	C.G.E. Co.	3,000	.....	.....	6,000
Belleville Portland Cement	44,000— 600	C.G.E. Co.	600	.....	.....	2,250
Belleville	44,000— 2,400	C.G.E. Co.	2,250	.....	.....	2,250
Brighton	44,000— 2,400	C.G.E. Co.	2,250	.....	.....	2,250
Colborne	44,000— 2,400	C.G.E. Co.	300	.....	.....	300
Newcastle	44,000— 2,400	C.G.E. Co.	100	.....	.....	100
Bowmanville	44,000— 2,400	C.G.E. Co.	100	.....	.....	100
Oshawa	44,000— 4,160	C.G.E. Co.	1,500	.....	.....	1,500
Port Hope	44,000— 2,400	C.G.E. Co.	3,750	.....	.....	5,250
Napanee	44,000— 2,400	C.G.E. Co.	1,050	.....	.....	1,050
Wellington	44,000— 4,160	C.G.E. Co.	600	.....	.....	600
Cobourg	44,000— 2,400	C.G.E. Co.	300	.....	.....	300
Picton	44,000— 2,400	C.G.E. Co.	300	.....	.....	300
Deseronto	44,000— 2,400	C.G.E. Co.	600	.....	.....	600
Kingston	44,000— 2,400	C.G.D. Co.	2,250	.....	.....	2,250
Millbrook	44,000— 2,400	C.G.E. Co.	100	.....	.....	100
Trenton	6,600— 4,160	C.G.E. Co.	750	.....	.....	750
Lindsay	6,600— 2,400	C.G.E. Co.	600	.....	.....	600
.....	44,000— 2,400	C.G.D. Co.	1,500	.....	.....	1,350
.....	11,000— 2,400	C.G.E. Co.	750	.....	.....	2,250
Peterboro	6,600— 2,400	C.G.E. Co.	2,250	.....	.....	2,250
Omeme	6,600— 2,400	C.G.E. Co.	750	.....	.....	3,000
Lakefield	6,600— 4,160	M.E.Co.	120	.....	.....	120
Norwood	44,000— 2,400	P.E.Co.	225	.....	.....	225
Marmora	44,000— 2,400	M.E.Co.	50	.....	.....	300
System Spare .....	.....	C.G.E. Co.	750	.....	.....	50
						750
						34,325

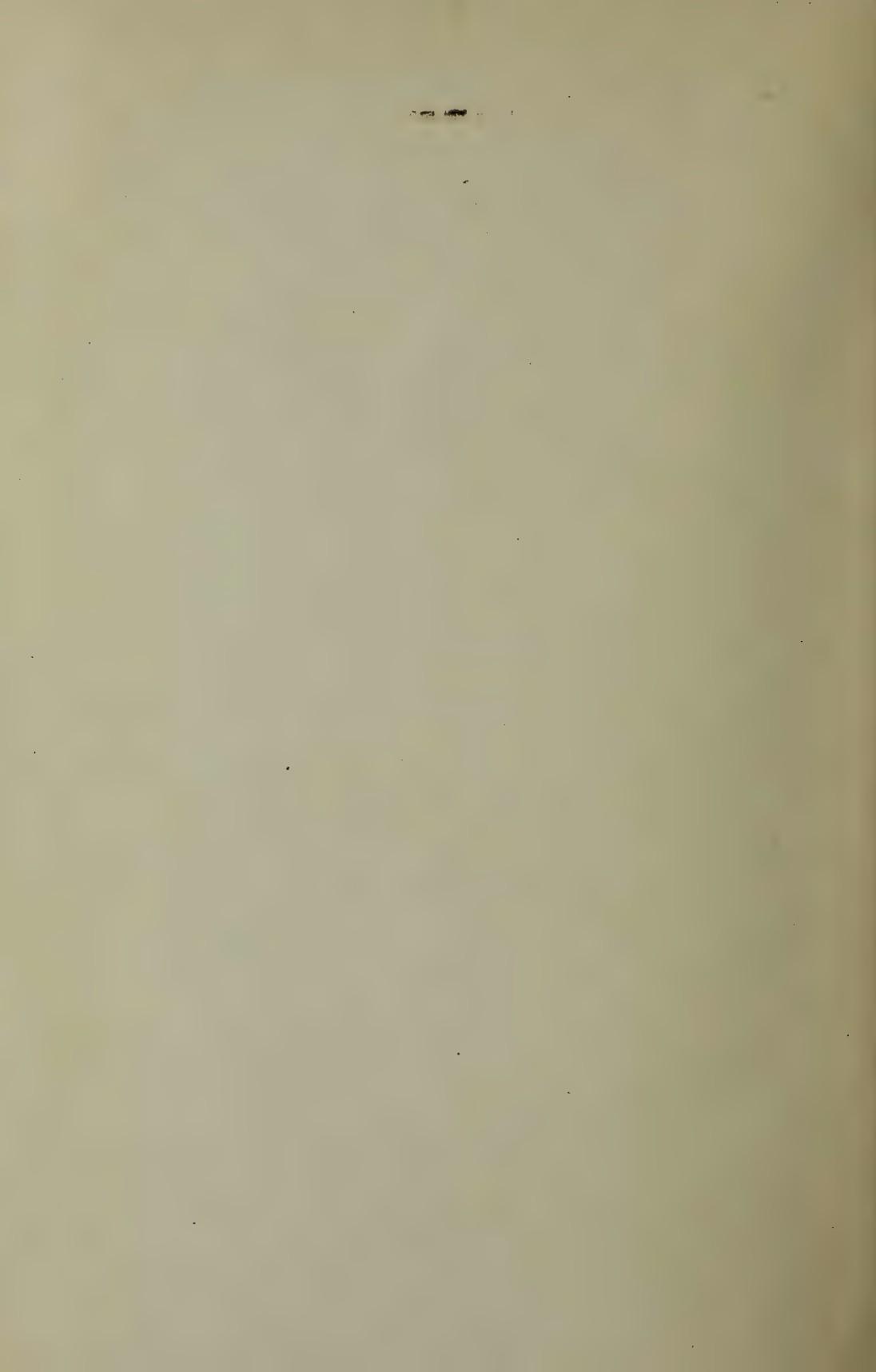
RIMEAU SYSTEM.					
High Falls Generating Station	4,160— 25,400	P. E. Co.	2,250		2,250
Smith's Falls Dist. Station	25,400— 2,400	C.G.E. Co.	750		750
Perth	25,400— 2,400	C.G.E. Co.	600		600
Merrickville	25,400— 2,400	C.G.E. Co.	750		750
Carleton Place	26,400— 2,200	P.T. Co.	750		750
					5,100
THUNDER BAY SYSTEM.					
Nipigon Generating Station	12,000— 62,500	C.G.E.	32,000		32,000
" "	63,500— 22,000	C.G.E.	16,000		16,000
Port Arthur (Nipigon), Trans. Station	22,000— 2,200	S.C. of C.	5,250		5,250
					53,250
MUSKOKE SYSTEM.					
South Falls Gen. Station	6,600— 22,000	C.G.E. Co.	1,200		1,200
Huntsville Dist. Station	22,000— 2,300	C.G.E. Co.	900		900
					2,100
NIPISSING SYSTEM.					
Nipissing Gen. Station	2,200— 22,000	C.W. Co.	900	P.E. Co.	2,700
North Bay Dist. Station	22,000— 2,200	C.W. Co.	1,350		3,600
Callendar	22,000— 2,200	A.C.B. Co.	50		1,350
Powassan	22,000— 2,000	C.G.E. Co.	50		50
					5,050

Table No. 2

STATION TRANSFORMERS ORDERED FOR MUNICIPALITIES AND COMMISSION
DURING FISCAL YEAR ENDING OCTOBER 31st, 1920

Station	Cycles	Voltage	Mfr.	No.	Kv-a. each	Total Kv-a.
NIAGARA SYSTEM.						
System Spares	25	110,000- 26,400	C.G.E.Co.	4	2,500	10,000
Niagara Falls Mun. Sta.	25	13,200- 2,300	C.C.W.Co.	1	1,500	1,500
Waterloo Mun. Station	25	26,400- 2,300	C.W.Co.	3	750	2,250
Woodstock "	25	26,400- 2,300	P.E.Co.	3	300	900
Tillsonburg "	25	26,400- 2,300	C.G.E.Co.	3	250	750
Sarnia "	25	26,400- 2,300	M.E.Co.	1	1,500	1,500
EUGENIA SYSTEM.						
Priceville	60	22,000- 2,200	G.E.Co.	2	10	20*
Hanover	60	22,000- 2,300	P.E.Co.	2	750	1,500
SEVERN SYSTEM.						
Alliston Dist. Sta.	60	22,000- 2,300	P.E.Co.	3	75	225
BRUCE COUNTY SYSTEM.						
Wingham Dist. Station	60	22,000- 2,300	C.G.E.Co.	3	250	750*
Holyrood "	60	22,000- 2,200	C.W.Co.	3	100	300*
Teeswater "	60	22,000- 2,200	C.G.E.Co.	3	50	150*
Kincardine	60	22,000- 2,200	C.W.Co.	3	125	375*
WASDELL'S FALLS SYSTEM.						
Kirkfield Crushed Stone Dist. Station	60	22,000- 4,000-	P.E.Co.	3	75	225
		550	M.E.Co.	3	10	30
CENTRAL ONTARIO SYSTEM.						
Lakefield Dist Station	60	6,600- 24,000	P.E.Co.	3	75	225
Norwood "	60	44,000- 2,400	P.E.Co.	1	300	300
Marmora "	60	44,000- 2,400	M.E.Co.	1	50	50
ST. LAWRENCE SYSTEM.						
Williamsburg Dist. Station	60	4,400- 2,400	M.E.Co.	1	50	50
Apple Hill "	60	44,000- 2,400	P.E.Co.	1	300	300
Alexandria "	60	44,000- 2,400	P.E.Co.	1	360	300
NIPISSING SYSTEM.						
Nipigon Generating Station	60	2,300- 23,000	P.E.Co.	3	900	2,700
Queenston Gen. Station	25	12,000-110,000	C.W.Co.	15	15,000	225,000

*Transferred from Stores or other Stations.



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